REPORT

OF THE

BOARD OF STATE ENGINEERS

OF THE

STATE OF LOUISIANA

TO

HIS EXCELLENCY MURPHY J. FOSTER,
GOVERNOR OF LOUISIANA,

FROM

APRIL 20, 1896, TO APRIL 20, 1898.

THE LIBRARY OF THE
JUL 25 1933
UNIVERSITY OF ILLINOIS

BATON ROUGE:
PRINTED BY THE NEWS PUBLISHING COMPANY.
1898.

627
L932
1896/98
cop. 2

Report of the Board of State Engineers.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
New Orleans, La., April 20, 1898.

To His Excellency, Murphy J. Foster, Governor of Louisiana:

SIR:—The following report, covering the period from April 20, 1896, to April 20, 1898, is respectfully submitted for your Excellency's information.

DUTIES OF THE BOARD.

"The duties devolving upon the Board, under Act 33, of 1879, by which it was created, are to make surveys of water courses, public works and levees of the State, report to the Governor the levees and improvements necessary to be constructed, examine and measure the work so done under State contracts, and to certify amounts for payment. Also to make such surveys as may be required by parochial authorities in the repair and construction of levees and other public works, and to take charge of and preserve the records and archives of the State Engineer Department.

"Under the subsequent laws, they have been made in general terms, the Engineers and advisers of the Boards of Levee Commissioners of the several levee districts of the State. as follows:

The Fifth Louisiana Levee District, by Act 44, of 1886;

The Tensas Basin Levee District, by Act 59, of 1886;

The Red River, Atchafalaya and Bayou Bœuf Levee District, by Act 79, of 1890;

The Pontchartrain Levee District, by Act 95, of 1890;

The Atchafalaya Basin Levee District, by Act 97, of 1890;

The Lafourche Basin Levee District, by Act 13, of 1892;

The Lake Borgne Basin Levee District, by Act 14, of 1892;

The Caddo Levee District, by Act 74, of 1892;

The Bossier Levee District, by Act 89, of 1892; the Buras Levee District, by Act 18, of 1894;

The Cat Island Levee District, by Act 110, of 1894.

"Under Act 79, of 1892, it is the duty of the Board to approve or disapprove the location, construction and repairs of levees on the river front of the Orleans Levee District; and Act 144, of 1888, makes it the duty of the Board to furnish lines, levels, plans and estimates for the execution of work on the New Basin Canal."

During the past two years, as heretofore, the several members of the Board of State Engineers have attended to such duties as occasion required in all parts of the State. While the care and attention of none of them has been confined exclusively to any particular locality or district, it has been found convenient to have most of the levee work in the Lafourche Basin, Lake Borgne Basin and Buras Levee Districts, done under the immediate supervision of Assistant State Engineer Lewis; that in the Fifth Louisiana and Pontchartrain Levee Districts, under Assistant State Engineer Thompson; that in the Tensas Basin, the Caddo, the Bossier, and the Red River, Atchafalaya and Bayou Bœuf Levee Districts, under Assistant State Engineer Kerr, and that in the Atchafalaya Basin Levee District, under Assistant State Engineer Perrilliat.

LEVEE WORK OF THE PAST TWO YEARS.

The improvement of levees in Louisiana and in that part of Arkansas upon which we depend for protection, has been continued during the period of this report, by the work of the several levee districts, the State, and the United States.

The work of the United States was to some extent curtailed and delayed by the failure of the Secretary of War to approve the allotments made by the Mississippi River Commission, in the summer of 1896, for levee purposes, from the expenditures authorized for the improvement of the Mississippi River, by the River and Harbor Act of that year; and during the autumn of 1897 all work on levees was greatly delayed and interrupted by the extraordinary, and often unreasonable, quarantine regulations generally prevailing at that time throughout the Southern States.

The prolonged high water season of 1897, extending far into the summer months, though not an unusual condition, was, of course, not favorable for the work of improvement, and the swollen state of the Mississippi River in February of this season, and the present high stage of water have interrupted work in many places where the river rose above its natural banks. But notwithstanding these drawbacks, the total quantity of work accomplished during the two years makes a very fair showing as compared with any similar period previously.

The result of the work accomplished since April 20, 1896, by the several levee districts, the State and the United States, in Louisiana and in that part of Arkansas, upon which we depend for protection, sums up approximately as follows:

WORK DONE.	Miles of New Levee Built.	Miles of Levee Raised and Enlarged.	Cubic Yards of Earthwork.	COST.
By the Levee Districts	27.65	157 94	6,863,839	$1,001,785 75
By the State	18.73	35.55	2,508,281	297,396 77
By the United States	4.60	174.89	6,169,068	816,159 38
Aggregates	50.98	368.38	15,541,188	$2,115,341 90

As regards locality, the work has been divided as follows:

LOCALITY.	Miles of New Levee.	Miles of Levee Raised and Enlarged.	Cubic Yards of Earthwork.	COST.
In Desha and Chicot Counties, Arkansas	0.14	34.42	1,067,333	$ 174,318 76
In Louisiana, on the Mississippi River	17.97	282.00	11,177 020	1,560,542 17
On Red River	10.71	16.76	867,514	86,842 28
On Bayou des Glaizes	5.46	3.57	216,232	23,681 53
On Atchafalaya River	1.36	17.04	396,964	47,669 54
On Bayou Lafourche	14.69	13.74	1,780,648	218,935 04
On Ouachita River	0.65	0.85	35,477	3,352 58
Aggregates	50.98	368.38	15,541,188	$2,115,341 90

In addition to this, a large sum has been expended by the several levee districts and by the United States for the clearing, protection and minor repairs to levees, and for wooden revetments which have been built by some of the districts in the lower part of the State.

The cost of this class of work done by the levee districts within the past two years amounts to about $201,000.00; while the aggregate of "high water expenses," incurred by them during the flood of 1897, exceeds $531,000.00.

We are unable to give the cost of similar work done and of high water expenses incurred by the United States.

Details as to location, character, extent and cost of the levee work of the past two years are given in the following remarks relative to "The Levee Districts," and in tabular form, in Appendix A.

THE LEVEE DISTRICTS.

The twelve corporate levee districts of the State remain constituted as they were two years ago.

No new districts have been created, though it has been proposed by some of the parties interested to form a new district on the left bank of the Mississippi, extending from the lower limit of the Lake Borgne Basin Levee District to Fort St. Philip. The improvement of levees along this stretch of the river would afford some protection to the Lake Borgne District as well as to the territory of the proposed new district; but the strip of arable land is comparatively narrow, and has been frequently overflowed by salt water from high tides in the gulf, so that its complete protection cannot be assured by levees along the river bank alone.

Most of the levee districts have considerable bonded debts, the aggregate of which exceeds $3,000,000.00.

All of their bonds bear six per cent. interest, and most of them have a comparatively short term to run before the time of redemption.

It is probable that a number of the districts may ask legislation to permit either an additional issue, or the substitution of the existing bonds by new issues having a longer term, and possibly with reduced rates of interest.

Such an arrangement should, in most cases, appreciate the value and security of the bonds, and permit a continuation of levee improvement without increasing the rates of taxation.

The Tensas Basin Levee District. The work undertaken in this district during the two years covered by this report is as follows: By the district, new levee, 0.65 miles; enlargement 3.88 miles, amounting to 155,872 cubic yards, costing $26,434.82 and $4,152.28 for work not paid for by the cubic yard. The enlargement of the line from stations 1040 to 1080 of the Fulton Lake levee was retarded and interrupted by the rising river in the early part of this year. Heavy rains and the absence of all natural facilities for drainage during the same period, and since, also largely contributed to the delay in completing this work. But while the work on this part of the Fulton Lake levee, undertaken by the district, has not been completed, the precaution has been observed to top the old levee to a grade 2 feet above the high water of 1897, throughout its length.

All of the work undertaken by the Tensas Basin Levee District, during the past two years, was done in the State of Arkansas, except 35,477 cubic yards, costing $3,352.58 on the Ouachita River, below Monroe.

In addition to the work done by the district, under contract, the sum of about $12,500.00 was also expended by it during the high water of 1897 in assisting to maintain the line of levee in the State of Arkansas.

The United States during this period has also built and enlarged about 31.53 miles of levee in the State of Arkansas to aid in the protection of the Tensas Basin Levee District from overflow.

The work above referred to as having been done by the United States amounted to about 946,938 cubic yards costing $147,084.24.

The Fifth Louisiana Levee District, during the flood of 1897, passed through the most trying period of its existence; but notwithstanding the severe strain placed upon its levees and also upon its means and resources, it sustained less injury than has befallen it in many previous seasons when the height and volume of the floods were much less. The work of strengthening and enlarging the weaker portions of the levee line, which had been carried on by the several levee authorities since 1893, with the timely preparations made for immediate protection in the spring of 1897, by the District Levee Board and the United States Engineers, supplemented by the untiring and efficient labors of the citizens of the district while the flood prevailed, resulted in holding the line long beyond any expectations that could have been entertained by a less energetic and hopeful people, and until the principal volume of the flood had passed down below the district. When the water had reached a stage nearly three and a half feet higher than ever before known, the levees at Biggs and Reid were broken, and the lower half of the district was generally overflowed, though the total overflow, and damage from overflow, were vastly less than in any of the preceding great floods.

It should also be noted that a large part of the overflow in the lower end of the district would have occurred whether or not the levees had broken, from water backing up from the unleveed front between Bougere Landing, and the mouth of Red River.

The high water of 1897 in the river along the front of the district reached higher stages than ever before recorded since 1865, as follows: At Lake Providence, 2.50 feet, on March 30; at Delta, opposite Vicksburg, 3.45 feet, on April 16; at St. Joseph, 2.55 feet, on April 17; at Vidalia, opposite Natchez, 1.20 feet, on April 29.

The following crevasses occurred in the district: April 16, 1897, at Biggs levee, near the lower end of Madison parish, in a levee about 16 feet high, built by the district in 1889, and in process of enlargement at time of break. April 19. 1897, at Reid levee, one and a half miles below the Biggs crevasse, in a levee built by the United States in 1896. April 17, 1897, at Glasscock levee, about ten miles above the lower end of the district levee system, in a levee built by the United States in 1883.

During the season of 1897 new levees have been undertaken by the United States to close these crevasses. Thus far, however, nothing has been done to extend the levee system below Bougere Landing, though it is understood that a bill making a special appropriation for this purpose has been introduced in Congress.

The amount and cost of the levee work done in the district during the past two years by the district, the State and the United States is approximately as follows:

WORK DONE.	Miles of New Levee Built.	Miles of Levee Raised and Enlarged.	Cubic Yards of Earthwork.	COST.
By the District	1.04	46.84	1,607,196	$ 239,459 40
By the State	2.48	8.39	604,201	70 515 41
By the United States	2.11	45.75	2,363,895	344,576 51
Total	5.63	100.98	4,575,292	$654,551 32

The high water expenses of the district in 1897 were about $67,600.00.

The Atchafalaya Basin Levee District, during the last two years, did a great deal of work, and was subjected in 1897 to the greatest flood height that ever came against its levee line. From April, 1896, to the high water season of 1897, the district exerted its efforts mainly in the raising and enlargement of the levees on the Atchafalaya River and on Bayou Lafourche, doing only a limited amount of work on the Mississippi River. This was done for the reason that up to that time the efforts of the district had been concentrated on its Mississippi River levees, and the levees on its interior streams had been neglected. As a result of this, its entire Mississippi River front had been, prior to the flood of 1897, raised to a grade nowhere less than 2½ feet and generally 3 feet above the highest waters of the past. Moreover, the United States Government was expending all of the funds allotted to the district on the Mississippi River front, thereby enabling the district authorities to give its much needed attention to the levees on the interior streams. The result of this was that prior to the 1897 high water, the levees on the Atchafalaya River were generally 3 feet above the highest water of the past, and on Bayou Lafourche. between Donaldsonville and Lafourche Crossing, the levees had been raised and enlarged to a similar grade above the highest waters of the past, and some work had been undertaken on the levee line from Lafourche Crossing down.

The flood of 1897, however, changed these conditions. It exceeded everywhere by varying amounts the highest floods of the past. On the Mississippi River front, this excess of flood height varied from 1.3 at Red River Landing, to 2.5 feet at Plaquemine. On the Atchafalaya River the excess was as much as 2.8 feet at Morris Bayou, a distance of about six miles above Melville. On Bayou Lafourche this excess was as much 2.3 feet at Paincourtville, dwindling down to an excess of 0.8 of a foot at Lockport.

As a result of this condition of affairs, which rendered necessary the determination of new grades throughout the district, the Levee Board, immediately after the flood of 1897, resumed its operations on the Mississippi River, devoting to levee construction on that stream the bulk of its resources.

This policy was evidently the wisest one to be pursued, in view of the fact that any disaster occurring on the Mississippi River involves damage to a much greater amount of territory than disasters on its side streams, which are bound to be more or less local in character.

By an agreement reached between the United States authorities and the local district authorities, the United States Government undertook the levee work situated in the northern part of the district as far down as Port Allen, while the district authorities did the bulk of their work in the southern part of the district below Port Allen.

An exceedingly large amount of work was done in the last two years, as is shown by the tabulation appended hereto. In addition to this, a certain amount of work was done on the Atchafalaya River subsequently to the flood of 1897, with a view of raising and enlarging the weakest levees, and of raising those levees, near the lower end of the levee system, which had demonstrated ample strength in section, but had been overtopped by the excessive flood of 1897. On Bayou Lafourche, the raising and enlarging of the levees also progressed with a fair pace under a contract especially entered into by the Levee Board with certain parties for the raising and enlarging of levees by machinery. The purpose of this work being to take the earth from the bed of the bayou and therewith enlarge the existing levees, which would have had to be abandoned for new locations had the work been done in accordance with usual methods. This contract is progressing satisfactorily, and, to all appearances, will result in a very material saving to the district.

The history of the past on Bayou Lafourche, however, has demonstrated the impracticability of maintaining a satisfactory levee system on its banks. The water in the lower portion of the bayou reaches an abnormal flood stage long before the high water mark has been reached on the Mississippi River, and crevasses have always occurred on lower Bayou Lafourche when the water at Donaldsonville was still several feet below the high water mark. A study of the floods on this stream demonstrates the desirability of closing up Bayou Lafourche at its head, by a dyke or by locks, in such a manner that it will no longer be an open outlet of the Mississippi River. Much money will thereby be saved to the State and to the levee districts, and disaster averted to the people.

During the 1897 high water, there was one crevasse in the Atchafalaya Basin Levee District. This took place on April 15, at 2 P. M., at Babin's, about one and a quarter mile below Lafourche Crossing. On May 25 this crevasse measured 317 feet in width, and its effect, from the time of its occurrence, was such as to lower considerably the flood height on Bayou Lafourche and relieve the Lafourche levees from further strain. No attempt was made to close it.

In Appendix B, under a report to the Board of Levee Commissioners, dated June 14, 1897, will be found a detailed history of the flood of 1897 in Atchafalaya Basin Levee District.

The following tabulation gives the amount of work done in the Atchafalaya Basin Levee District during the past two years, by the District, State and United States authorities on the various streams within the district, and states the character and cost of the work:

WORK DONE.	MILES.		Cubic Yards of Earthwork.	COST.
	New Levee	Enlargement.		
ON THE MISSISSIPPI RIVER.				
By the District	1.53	31.14	1,590,454	$215,216 49
By the State	0.93	0.93	325.259	40,918 19
By the United States	....	28.55	1,171,717	137,872 25
Totals	2.46	60 62	3,086,430	$394,006 93

ON THE ATCHAFALAYA RIVER.

By the District	1.15	14.36	308,918	$ 37,206 09

ON BAYOU LAFOURCHE.

By the District	3.72	6.61	488 498	$ 63,760 13
By the State........	0.38	....	45,394	5,787 73
Totals	4.10	6.61	533,892	$ 69,547 86

RECAPITULATION THROUGHOUT THE DISTRICT.

Work Done.	Miles.		Cubic Yards of Earthwork.	Cost.
	New Levee.	Enlargement.		
By the District	6.40	52.11	2,387,870	$316,182 71
By the State................................	1.31	0.93	369,653	46,705 92
By the United States.................	....	28.55	1,171,717	137,872 25
Grand Totals.......................	7.71	81.59	3,929,240	$500,760 88

Since April 1896, to the present date, the sum of $91,324.20 has been spent by the district on high water work and general repair and maintenance.

The Cat Island Levee District remains, as heretofore, a levee district only in name. No work has ever been undertaken by the district; and considering the difficulties that must be dealt with in any attempt to protect it against overflow from high water of the Mississippi River, without at the same time subjecting it to partial inundation from rain water, seepage water and drainage from the hills, together with the large cost that would be involved as compared with the possible revenues, it is not probable that any movement will be made to construct levees there for many years to come.

The Pontchartrain Levee District was unable to undertake any considerable amount of levee work during the levee season of

1896; but about the close of 1897 contracts were made by the District Levee Board for raising and enlarging the lowest and weakest levees in each of the parishes below East Baton Rouge, involving over 250,000 cubic yards of earthwork, and covering an aggregate length of levee of about twelve and a half miles. The grade of this work was placed only two feet above the highest recorded water (1897) with a view of covering a greater length of line than would have been possible with the somewhat higher standard provisionally adopted for levees along this part of the river. Most of this work has been completed, and compares favorably with other parts of the levee line in the same localities. The enlargement of levees in East Baton Rouge parish to standard grades and sections had previously been provided for by the United States Engineers, and a large portion of the work is already done.

The extreme flood height of 1897 reached higher stages in the river along the front of the district than any earlier date, by 2.20 feet at Baton Rouge (upper end of district) and 1.55 feet at Carrollton (lower end of district); while at a number of intermediate points it exceeded highest previous records by more than 2.50 feet.

From the latter end of March to near the middle of June the water continued at such a height against the levees as to cause some anxiety for their safety and demand constant care and attention. A patrol train supplied with men, tools and materials for any emergency was kept on the railroad from March 31, to June 8, and passed up and down the line as occasion required.

During the high water stages of the flood the district was menaced with overflow by the insecure condition of the levee in the lower part of the city of Baton Rouge. Several crevasses occurred in this line, and though they were fortunately closed before any damage resulted to the Pontchartrain District, they so clearly demonstrated the impending danger that a temporary coffer dam or "box levee" was built around the threatened locality, the cost of which was partly borne by the district. The condition of the Baton Rouge levee not having been improved up to the present time, the District Levee Board has just undertaken the construction of a protection levee, within its own territory, to run across from the hills to the front levee. Narrow gaps are to be left in this levee for the railroad, and for the ordinary drainage naturally passing the line, which can be closed promptly whenever it becomes necessary to do so for the protection of the district.

On May 30, 1897, after the river had declined nearly two and a half feet, a crevasse occurred in the levee at Concord Point, about eight miles below Baton Rouge. It reached a width of about 240 feet and washed out a hole from 13 to 17 feet in depth. The breach was effectually closed by the night of June 7. The overflow carried by this crevasse was limited by its early closure to a comparatively small area, and the resulting damage was confined to the vicinity of the break.

The high water expenses of the district for 1897 are reported as $38,532.06.

The amount and cost of levee work done in the district during the past two years by the district, the State and the United States, is approximately as follows:

WORK DONE.	Miles of New Levee Built.	Miles of Levee Raised and Enlarged.	Cubic Yards of Earthwork.	COST.
By the District	0.25	11.46	287,192	$ 50,390 83
By the State	0.27	1.45	136,323	22,902 35
By the United States	0.99	24.10	875,599	94,714 30
Total	1.51	37.01	1,299,114	$168,007 48

In the Lafourche Basin Levee District, the levee work undertaken by the State and district for the past two years has been the building of 2.08 miles of new levee and the enlargement of 7.47 miles of existing levees on the Mississippi River, its eastern boundary, amounting to 460,694 cubic yards and costing $76,201.86, and the building of 10.59 miles of new levee and the enlargement of 7.13 miles of existing levees on Bayou Lafourche, its western boundary, amounting to 1,246,756 cubic yards, costing $149,387.18. The district has also expended in minor repairs in various parts of the district, such as cutting out and refilling crayfish holes, restoring wave-wash, in the construction and repair of revetments, and mowing weeds, some $35,504.90. The high water expenses of 1897 were $99,999.26.

The United States has built 0.23 miles of new levee and 35.17 miles of enlargement of existing levees, fronting the Mississippi River, amounting to 605,216 cubic yards, costing $65,984.12.

The flood of 1897 was about 2.2 feet higher at Donaldsonville, the upper end of the district, and about 0.7 of a foot higher at Socola's Canal, the lower end of the district, than any one of previous record. Of the one hundred and twenty miles of levee fronting the river, the eastern boundary of the district, one and a third miles would have been overtopped by the high water of 1897. Whilst on Bayou Lafourche, the western boundary of the district, the high water mark of 1897 against the levee line as compared with highest previous record, was as follows:

LOCATION.	1892	1893	1897	Difference.
	ELEVATION (FEET) CAIRO DATUM.			IN FEET.
At Donaldsonville	....	50.21	52.50	+2.3
At Paincourtville	....	47.30	49.50	+2.2
At Napoleonville	....	46.08	47.90	+1.8
At Thibodaux	42.00	....	43.80	+1.8
At Raceland	39.90	....	41.30	+1.4
At Lockport	38.40	....	39.20	+0.8
At Harang's Canal	34.00	....	34.80	+0.8

Necessitating the raising of over twenty miles of the seventy-five miles to meet the exigencies of the flood, and as follows: Three and a half miles in Ascension parish; eight miles in Assumption parish, and nine miles in Lafourche Parish.

There were two crevasses on the Bayou in this district, the Jaundron crevasse, three miles below Harang's Canal, which occurred on March 29, 1897, and the LeBlanc crevasse, five miles below Lockport, which occurred on April 1, 1897. The damage resulting from these breaks was local.

Orleans Levee District. The following information relative to the levees of this district, and the work of the last two years, has been kindly furnished us by Mr. Gervais Lombard, Chief Engineer of the district:

"STATEMENT OF THE WORK DONE BY THE ORLEANS LEVEE BOARD BETWEEN APRIL 20, 1896, AND APRIL 20, 1898.

"Very little has been done on the rear levees within the last two years, but now that the Drainage Board has commenced operations, they will do considerable work upon these levees.

"The Jourdan Avenue Pumping Station, which was built by the Orleans Levee Board at a total contract cost of $78,691.00, has been turned over to the city of New Orleans. The Levee Board also dug the Lower Protection Canal, and deepened the Florida Walk Canal. Contents 249,358.5 cubic yards, total cost $20,882.34.

"The high water fight cost $179,566.09, of which $21,561.00 was spent on the Upper Protection (interior) Levee, which was enlarged, with about 38,000 cubic yards of earth, and revetted with 201,242 feet B. M. of lumber. This work is permanent.

"The length of the levee line in our district is, right bank, about 13.81 miles; left bank, 12.64 miles; interior levees, 39.68 miles, making a total of 66.13 miles of levee.

"Grade of levees on the Mississippi River, compared with the high water of 1897, as follows: Five miles, 4 feet above; four miles, 3 feet above; eleven miles, 2.4 feet above; two miles, 1 foot above, and four miles (Commercial Front), level with, or below, high water of 1897.

“During the two years 1.05 miles of new levee was built; 22.91 miles of enlargement, amounting in all to 700,955.2 cubic yards, at a total cost of $144,247.94. The total length of revetment built was ten miles, which cost $144,706.36. About one mile of this was pile bulkhead, and about one mile was in the form of a skeleton wharf (bank protection) which cost about $13.00 per linear foot.”

Projects for the levee work undertaken on the river front have generally been submitted to the Board of State Engineers, in accordance with Section 6, of Act No. 79, of 1892, which with but few exceptions have been approved.

In the Lake Borgne Basin Levee District, the District Levee Board has expended, during the past two years $10,009.16 in repair work, such as restoring wave-wash and the cutting out and refilling of crayfish holes, the repair and renewal of revetments and the mowing and weeding of levees, in addition to the work of levee enlargement done under contract by the cubic yard. The high water expenses of 1897 were $17,263.29.

The flood of 1897 was about 1.7 feet higher at the upper end of the district, and about 0.7 of a foot higher at the lower end than that of 1892, the highest of any previous record.

There were 3,585 feet out of 47 miles of levee raised as the exigencies of the situation demanded, of which the water would have actually overtopped only 185 feet.

The levee work undertaken and executed in this district from April 20th, 1896, to April 20th, 1898, is divided as follows:

WORK DONE.	Miles of New Levee Built.	Miles of Levee Raised and Enlarged.	Cubic Yards of Earthwork.	COST.
By the District..........................	1.44	1.59	58,535	$ 6,536 87
By the State....	0 42	3.66	101,951	14,191 60
By the United States..................	....	9.46	140,852	17,509 51
Total..	1.86	14.71	301,338	$38,237 98

Buras Levee District.—The District Levee Board reports expenditures during the past two years of $18,480.62, as follows:

In the construction and enlargement of levees	$ 4,919 69
In the maintenance and repair of levees	3,187 48
In the clearing and mowing of levees	518 05
In protection by wooden revetments and otherwise	3,427 30
High water expenses during flood of 1897.	6,428 10
Total	$18,480 62

The total work in the district done by contract amounts to 3.15 miles of new levee, 3.13 miles of enlargement, and 147,981 cubic yards of earthwork, at a cost of about $19,304.54, divided as follows:

By the District, 0.35 miles of new levee, and 2.66 miles of enlargement, and 34,921 cubic yards of earthwork, at a cost of $4,864.69.

By the State, 1.67 miles of new levee, amounting to 48,209 cubic yards of earthwork, costing $6,021.40.

By the United States, 1.13 miles of new levee, 0.47 miles of enlargement, and 64,851 cubic yards of earthwork, at a cost of $8,418.45.

The flood of 1897 was about 0.7 of a foot higher at upper end, and about 0.3 of a foot higher at lower end of the district than any one of previous record.

In the 34 miles of levee line in this district, about 4 miles would have been overtopped by the river had they not been raised by the Levee Board in advance of the flood. There were two crevasses in the levees in this district, one at Melrose and the other at Guesnard Woods, caused by the giving way of defective rice flumes. These breaks were promptly closed before any great damage occurred to the district.

In the Caddo Levee District, no levee work was done by the district nor by the United States during the two years covered by this report. The State, however, was able to build 3.11 miles of new levee and 6.23 miles of enlargement, amounting to 291,879 cubic yards, and costing $29,926.82. All of this work is completed.

The extent of the levee line in the Caddo Levee District remains about the same as stated in the report of the Board of State Engineers, dated April 20, 1896, page 24—the work performed by the State, in the past two years, consisting only in improving the grade and section of certain parts of the line most requiring immediate attention, and in building new levees on certain parts of the line where the then existing levee was either already breached or threatened by caving banks.

The general condition of the line so far built and improved is fairly good, but in many places it has suffered much from various abuses; notably from travel over and across it, from the rooting of hogs, and permitting trees to take root and grow to considerable dimensions upon it.

Much levee work is still required in the district in the way of extensions to close the gaps still remaining in the line, and in certain localities to improve the grade and section of the existing line.

The Bossier Levee District has also a record of no work by the district, nor by the United States during the period covered by this report. The contribution by the State to the welfare of the district, however, was 5.79 miles of new levee, 6.05 miles of enlargement, amounting to 363,955 cubic yards, costing $37,130.99.

The remarks made in regard to the present condition of the levees in the Caddo Levee District, are equally applicable to the Bossier Levee District.

In the Red River, Atchafalaya and Bayou Bœuf Levee District, the work done in the past two years is as follows: By the District, new levee, 5.46 miles; enlargement, 4.17 miles, amounting to 233,239 cubic yards, costing $25,717.26; by the State, new levee, 2.02 miles; enlargement, 6.56 miles, amounting to 282,719 cubic yards, costing $28,212.19. This represents a total of 7.48 miles of new levee, 10.73 miles of enlargement, and 515.958 cubic yards of earthwork, costing $53,929.45.

The Ten Mile Stretch Levee, in Avoyelles parish, on Bayou des Glaizes, which was begun only about the first of February, is not completed at this date.

No levee work has ever been done in this district by the United States.

That part of the leveed portion of this district, extending from about Moreauville, on Bayou des Glaizes, to Melville, on the Atchafalaya River, was subjected to the same trying struggle for protection against high water that prevailed in 1897 throughout the balance of the State, except on Red River, and although stages from two feet to three and a half feet higher than previously recorded were reached by the high water in this part of the district, the line was successfully held here except for about 3,500 feet, on Bayou des Glaizes, in what is known as the "Ten Mile Stretch."

Here the line was breached, during a storm, just as the high water reached its highest stage, and was about to enter on a decline.

No general damage to the district, however, resulted from this crevasse.

The defense made by the district during this time cost not less than $22,000.00.

No extension to the levee line of this district has occurred in the past two years, but several stretches in the line have been much improved by enlargement and new levees, and the work now under way, by the district, along the Ten Mile Stretch on Bayou des Glaizes will, when completed, constitute one of the most needed and meritorious steps in the march of progress so far taken by this district.

Much of the front of this district still remains unleveed, and much work must still be done in the way of extension, notably, from the lower end of the present levee line on Red River, across Choctaw Bayou to the Avoyelles prairies; from the lower side of the latter, across Bayou des Glaizes, to a junction with the existing line on the right bank of the same, and from Melville to a point near the mouth of Bayou Courtableau, and, possibly, for some distance up the north bank of the latter. Much of the existing line also requires improvement in grade and section, and no little attention will yet be required in regard to drainage in many parts of the district.

While the abuses to which the levees in this district are subjected are not quite so flagrant and common as in the other districts on Red River, except possibly, in Big Bend, on Bayou des Glaizes, there is in many localities considerable room for improvement in the manner in which they are being cared for and maintained.

HIGH WATER AND CREVASSES.

The flood of 1897 reached higher stages in all that portion of the Mississippi River immediately affecting Louisiana than any of previous records. At Arkansas City it was 1.60 feet higher than ever before known; at Lake Providence, 2.50 feet higher; at Vicksburg, 3.45 feet higher; at St. Joseph, 2.55 feet higher; at Natchez, 1.20 feet higher; at Red River Landing, 1.33 feet higher; at Baton Rouge, 2.20 feet higher; at College Point, 2.05 feet higher; at New Orleans, 1.60 feet higher, and at Fort Jackson, 0.30 of a foot higher. (For comparison with other years, see Appendix D.)

There is no reason to doubt that the water would have risen still higher in some parts of the river between the mouths of the Arkansas and the Yazoo, but for the breaking of the levees in the State of Mississippi at several points in this stretch of the river, in the last days of March and before the flood had reached its culmination. While it is not improbable that the water escaping from these breaks, upon its return to the river at the mouth of the Yazoo, produced higher stages than would otherwise have been attained in that vicinity, it is evident that a somewhat higher gauge reading would have occurred at Vicksburg but for the Biggs crevasse, which took place while the river was rising at the rate of nearly half a foot per day. It is also probable that the river was higher at and near the mouth of Red River than it would have been but for the Reid and Biggs crevasses, in consequence of the returning flood water which accumulated in the lower Tensas Basin, though on account of the comparatively low stage of Red River, this effect was not as pronounced as in the similar case at and near the mouth of the Yazoo.

Fortunately there was no flood of consequence in Red River during the period of high water in the Mississippi, though, of course, the affluent streams, Bayou Lafourche and the Atchafalaya, responded to all the flood stages of the parent stream.

As the crest of the flood swept down the river, threatening in its progress to overtop the levees in one locality after another, the people in most districts came out almost *en masse* to guard, protect, and strengthen the embankments, and an immense amount of labor, material and money was expended in giving them additional height, revetting them against waves and currents, stopping leaks and strengthening weak looking places, and in other precautionary measures. The expenditures of the several levee districts in this work aggregate over $531,000.00, not including a very large amount of work and expenditure by private parties, and by the United States.

It is due to the energy displayed at that time by the citizens and commissioners of the districts and by the United States Engineer Department, as much as to the strength of the levees themselves, that the State so largely escaped destructive overflow.

On March 25th a break occurred in Amos Bayou Levee, in Desha county, Arkansas, built in 1894 by the Tensas Basin Levee

District. It was due to a leak or hole of some kind through the levee. The break was in a levee about ten feet high, and reached a width of 730 feet. Its effect was not important, as it was situated within two and one-half miles of the head of the levee system at Costello's Gin, above which point the water flowed across the unleveed Amos Bayou Ridge, in a volume estimated as at least ten times greater than that passing through the crevasse.

On April 16th the Biggs levee, in the Parish of Madison, about four miles below Delta, broke in consequence of being overtopped by the rising water, and as an immediate cause, by the waves of a passing steamer. It was in a levee built by the Fifth Louisiana Levee District in 1889, on which a large force was at work, and had been for some time previous, raising it against the rising water. Earth for raising had become scarce and the base of the embankment was already insufficient for its height, so that there could have been little hope of holding it much longer if the rising river continued. The levee was about sixteen feet high, and the crevasse became 2,500 feet wide. This was much the largest and the most destructive crevasse in the State.

The Reid crevasse, a mile and one-half below the Biggs, occurred on April 19th. It was in a levee about nineteen feet high, built by the United States in 1896, and attained a width of about 1,100 feet. It was supposed to be caused by the water going over the top—although it had been considerably raised before the Biggs crevasse took place—and by sloughing of the land side slope.

The water from these two crevasses overflowed a large part of Madison parish and the greater portion of Tensas parish, and added to the extent and depth of overflow in Concordia and Catahoula parishes, which were already considerably flooded by the water backing in and up through the unleveed front below Bougere Landing.

On April 17th a break took place in the Glasscock levee in the lower end of Concordia parish, in a levee about fourteen feet high, built by the United States in 1883. The break became about 1,400 feet wide, but as it was within eight or ten miles of the lower end of the levee system in the district, it only added to the volume of water already overflowing the country behind it, and coming from the unleveed front already referred to.

Below the mouth of Red River the only breaks not promptly closed within a few days of their occurrence, were in the levees of the lower Lafourche, and on the section of Bayou des Glaizes known as the "Ten Mile Stretch," where the natural banks are high and levees had never been built, except small ridges thrown up by private enterprise.

On March 29th a break occurred in the Jaundron levee, three miles below Harang's Canal, on the left bank of Bayou Lafourche. The levee was about eight feet high. and the crevasse became about 150 feet wide. On April 1st, the Leblanc levee, also on the left bank of the bayou, five miles below Lockport, broke. The levee was about nine and one-half feet high, and the crevasse became 250 feet wide.

Both these crevasses were so near the lower end of the Lafourche Basin Levee District that the resulting overflow and damage were limited to the immediate locality.

On April 15th a break took place in the Babin levee, on the right bank of Bayou Lafourche, one mile below Lafourche Crossing. The levee was about seven and one-half feet high, and the crevasse reached a width of 317 feet. The overflow from this break, while more extensive and injurious than that from the other crevasses on Bayou Lafourche, was also local in character and confined to a comparatively small section of the Atchafalaya Basin Levee District.

On May 8th, during a violent rain and wind storm, four breaks took place in the levee on the "Ten Mile Stretch" of Bayou des Glaizes. The levee, which had been hastily thrown up as the water rose, and was in process of enlargement, was about five feet in height. The aggregate width of the crevasses became about 3,500 feet. Beyond the purely local damage in Big Bend, produced by the overflow from these crevasses, the injury caused by them to the Red River, Atchafalaya, and Bayou Bœuf Levee District was very small.

These crevasses during the flood of 1897 caused but a small extent of overflow in Louisiana as compared with that of previous flood years. The greater area inundated was in the lower portion of the Fifth Louisiana Levee District, a large part of which would have been laid under water in any event at the highest stage of the river, from the flow over the unleveed front of the district between Bougere Landing and the mouth of Red River.

At this date (April 20, 1898), a flood of considerable magnitude, having its principal origin, like that of 1897, in the Ohio River, is passing down the Mississippi. Its crest now appears to be just passing the upper limit of the State. At Lake Providence the gauge is reported as indicating almost exactly the same stage (42.4 feet) as the highest of 1897.

In the lower portion of Bayou Lafourche (at Harang's Canal, about 70 miles below Donaldsonville), the water had already reached a stage slightly above the highest of last year, until relieved by a crevasse three miles further down the bayou, which occured on the morning of April 19th, in the levee on the left bank, at Melancon's, within three or four miles of the lower end of the levee system of the Lafourche Basin Levee District.

LEVEE GRADES.

Most of the levees on the Mississippi below Donaldsonville, built or enlarged by the State and the levee districts, during the past two years, have had grades practically identical with those provisionally adopted by the Mississippi River Commission, viz: three feet above the high water of 1893 at the lower end of the levee system (at "the Jump") and thence increasing to four feet above the high water of 1893 at New Orleans, and to five feet at Donaldsonville. Above Donaldsonville it was not considered practicable, with the means likely to become available in the near future, to increase the grade of the levees beyond five feet above the high water of 1893. This tentative standard for levee grades has been adhered to, except that, since the flood of 1897, it has been thought proper to fix the grades between the Arkansas line and Donaldsonville at three feet above the high water of the latter year wherever this was higher than five feet above that of the former year. (See letter to Colonel Gillespie, Appendix C.)

It is not presumed that these grades will prove sufficient along all parts of the levee line for any flood that may occur; though it is believed that below Donaldsonville they may be found to afford some margin of safety above any flood not high enough to overtop the levees in the upper part of the State, so long as the grade of the last named levees is not increased several feet beyond the standard above described.

On Red River it has only been attempted, thus far, to put the levees which have been built or enlarged from time to time up to a grade of about three feet above the highest waters previously known. When the existing levee lines have been further tested by experience, and when they have been extended and made more nearly continuous, some closer approach to a proper final standard of grade should become possible.

On Bayou des Glaizes no general grade has ever been fixed, the proportions of most of the levee work done there having been dependent upon the means available at the time it was undertaken, and the grade varying from one to three feet above the highest previous waters.

The levees of the Atchafalaya River on the right bank—that is in the Red River, Atchafalaya and Bayou Bœuf Levee District—have had their grades fixed only in the same manner as above described for those of the Red River; but on the left bank, a provisional standard has been adopted for the levees of the Atchafalaya Basin Levee District which stands three feet above the highest water, that of 1897. There is no reason to doubt that grades higher than these will ultimately be found necessary on both sides of the Atchafalaya.

On Bayou Lafourche the grade now used for levee work in the Atchafalaya Basin Levee District (right bank) is generally three feet above 1897 above Lafourche Crossing, and two and a half feet above the same water below said point; while, by a recent resolution of the Board of Commissioners of the Lafourche Basin Levee District, the grade of levee work on the left bank is fixed at one and a half feet above high water of 1897 at Lockport, thence increasing to two and a half feet at Thibodaux and to three feet at Donaldsonville. The grade of levees on Bayou Lafourche has been continually increased, especially towards the lower end of the system, only to find that along this portion of the bayou the water has risen higher and higher until in most flood seasons it has broken through or over the levees. Under these circumstances the maintenance of levees below Lockport,—or even below Thibodaux,—is becoming almost an intolerable burden, and the people living along the bayou are now more generally in favor of closing the bayou at its head than formerly. This appears the only practicable measure of relief; and if a lock were placed at Donaldsonville to admit boats from the Mississippi River, navigation might be improved, and the levee problem disposed of so far as it concerns the bayou.

It should, of course, be understood that the grades for levees above described for the several streams of the State have not yet been reached in any general way by the work accomplished thus far; but that they only represent the stage of improvement to which the endeavors of the State and levee districts are now being directed, wherever means appear available for its attainment. Much of the levee work of the United States on the Mississippi

River above Donaldsonville (at least during the past year) has been built to higher grades than the State or the levee districts have been able to undertake.

NEW BASIN CANAL AND SHELL ROAD.

The improvement of the New Basin Canal and Shell Road has been continued during the past two years. The revetment and dredging of the basin between Magnolia street and its head at Rampart street, as proposed at the date of our report of April 20, 1896, has been completed, greatly increasing the facilities for the loading and discharge of vessels navigating the canal, providing more ample space for the handling of bulky materials, and preventing the further deterioration of the basin by the washing down of its banks.

The Board of Control has recently made contracts for revetting about a mile and a half of the west bank of the canal between the Louisiana Western Railroad bridge and Carrollton Avenue, and for filling between the bank and the revetment. For this work the Board of State Engineers has, upon request of the Board of Control, prepared plans and specifications, and made such surveys and given such lines and grades as were necessary.

The Board of Control has now in contemplation further improvements, such as the raising and widening of the shell road, the dredging of the canal and extension of the revetment, for which they desire anthority to issue bonds.

THE BAPTIST COLLET CANAL.

In pursuance of House concurrent resolution No. 48, approved July 7, 1896, the Board of State Engineers made an examination of the outlet described in the resolution as the "Baptist Collet Canal," "on the east bank of the Mississippi River, in the parish of Plaquemines, about ninety miles below New Orleans," with a view to determine if "the proper control of the river is in anywise endangered" by it.

The result of the examination led to the opinion that no such danger existed, and a special report to that effect was submitted on January 5, 1897, a copy of which accompanies this report, forming a part of Appendix C.

APPENDICES.

The following appendices are presented as a part of this report, viz:

APPENDIX A.—Tabulated statements relative to quantity, length and cost of levee work undertaken by the State of Louisiana, the several Boards of Levee Commissioners, the United States, etc., in Louisiana and a part of Arkansas, from April 20, 1896, to April 20, 1898.

APPENDIX B.—Copies of certain reports of the Board of State Engineers to the Boards of Levee Commissioners.

APPENDIX C.—Sundry special reports to the Governor, with letters to the Mississippi River Commission, United States Engineers, and others, and tabulated statements furnished to Sub-Committee of the United States Senate Committee on Commerce.

APPENDIX D.—High water records, from 1872 to 1897, inclusive.

APPENDIX E.—List of acts relative to levees and to the duties of the Board of State Engineers—from 1877 to 1896, inclusive.

APPENDIX F.—Maps showing location of levees on Mississippi River protecting the State of Louisiana (12 plates).

All of which is respectfully submitted,

HENRY B. RICHARDSON,
Chief State Engineer.
SIDNEY F. LEWIS,
H. BOL. THOMPSON,
FRANK M. KERR,
ARSENE PERRILLIAT,
Assistant State Engineers.

WALTER H. HOFFMAN,
Secretary.

APPENDIX A.

Tabulated Statements Showing Quantity, Length and Cost of Levee Work Undertaken by the State of Louisiana, the Several Boards of Levee Commissioners, the United States, etc., in Louisiana, and a part of Arkansas, from April 20, 1896, to April 20, 1898.

APPENDIX A. STATEMENT

Levee work undertaken by the State of Louisiana in the several Levee
April 20, 1898, with four contracts of earlier

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
			FIFTH LOUISIANA LEVEE			
1	Cottonwood	East Carroll	Nov.12,1897		6,065	
2	Morancy	East Carroll	Nov.18,1897	Mar.24,1898	3,086	
3	Delta to Young's Point	Madison	Aug.16,1897		3,380	31,254
4	Bedford	Madison	Jun. 29,1897	Mar. 5,1898	5,182	
5	Palmyra Bends	Tensas	Nov.26,1894	Aug. 6, 1896	880	92,693
	Totals				18,593	123,947
	Less amounts done previous to April 20, 1896, and not completed April 20, 1898				5,480	79,600
	Work done from April 20, 1896. to April 20, 1898				13,133 or2.48mls	44,347 or8.39mls
			ATCHAFALAYA BASIN LEVEE			
6	Chenango	W. Baton Rouge	Sep. 24,1897	Feb.19,1898		4.918
7	Hickey	W. Baton Rouge	Mar. 4, 1897	Oct. 21,1897	4,868	
8	Lafourche Crossing to Lockport	Lafourche	Nov.13,1895	Aug.26,1896	10,703	293
	Totals				15,571	5 211
	Less amount done previous to April 20, 1896				8,661	293
	Work done from April 20, 1896, to April 20, 1898				6,910 or1.31mls	4,918 or0.93mls
	The above is divided by streams as follows:					
	On the Mississippi River				0.93 mls	0.93 mls
	On Bayou Lafourche				0.38 mls	
	Totals				1.31 mls	0.93 mls
			PONTCHARTRAIN LEVEE			
9	Margaret	Iberville	Nov. 5, 1897		1,915	
10	Bonnet Carre	St. John	Aug. 16,1897			3,050
11	Parish Line	St. John and St. Charles	Sep. 24,1896	Aug. 3, 1897		5,600
	Totals				1,915	8.650
	Less amount not completed April 20, 1898				500	1,000
	Work done from April 20, 1896, to April 20, 1898				1,415 or0.27mls	7,650 or1.45mls

No. 1. STATE CONTRACTS.

Districts, under thirty-nine contracts entered into from April 20, 1896, to date, not completed on April 20, 1896.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
DISTRICT				
160,000	14.21	$ 22,736 00	Mississippi Riv.	
62,276	9.45	5,885 08	Mississippi Riv.	
330,000	12.75	42,075 00	Mississippi Riv.	
171,037	10.70	18,300 95	Mississippi Riv.	
514,118	10.73	55,164 87	Mississippi Riv.	Includes work at Woodburn, Ashwood, St. Joseph, Cottage Home and Bayou Vidal.
1,237,431	......	$ 144,161 90		
633,230	......	73,646 49		
604,201	......	$ 70,515 41		
....	......	....	....	Average price 11.67 cents per cubic yard.
DISTRICT				
49,872	17.40	$ 8,677 72	Mississippi Riv.	Includes work at Chenango and Marioneaux
274,387	11.75	32,240 47	Mississippi Riv.	
147,855	12.75	18,851 51	Bayou Lafourche....	Includes work at Bergeron, Pete, Braud, Rome, Folse, Authemant, Guidry and Delaune.
472,114	....	$ 59,769 70		
102,461	.....	13,063 78		
369,653	......	$ 46,705 92		
....	......	....	....	Average price 12.63 cents per cubic yard.
324,259	......	$ 40,918 19		
45,394	......	5,787 73		
369,653	.....	$ 46,705 92		
DISTRICT				
70,000	19.⅝	$ 13,737 50	Mississippi Riv.	
32,000	19.75	6,320 00	Mississippi Riv.	
63,323	13.50	8,548 60	Mississippi Riv.	
165,323	......	$ 28,606 10		
29,000	......	5,703 75		
136,323	......	$ 22,902 35		
....	......	....	....	Average price 16.06 cents per cubic yard.

APPENDIX A.

STATEMENT

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
			LAFOURCHE BASIN LEVEE			
12	Pike's Peak	St. James	Sep. 4, 1897	Mar. 7, 1898	4,462	....
13	Crescent	Ascension	Dec. 15, 1896	April 4, 1898	3,918	....
14	Nolan	Ascension	Dec. 15, 1896	....	678	12,036
	Totals				9,058	12,036
	Less amount not comple	ted April 20, 1898			298	....
	Work done from April 20,	1896, to April 20,	1898		8,760 or1.66mls	12,036 or2.28mls
	The above is divided by	streams as foll	ows:			
	On the Mississippi	River			0.84 mls	....
	on Bayou Lafour	che			0.82 mls	2.28 mls
	Totals				1 66 mls	2.28 mls
			LAKE BORGNE BASIN LEVEE			
15	Caernarvon and Orange Grove	Plaquemines	Nov. 9, 1897	....	....	9,400
16	St. Sophie and Harlem	Plaquemines	Nov. 9, 1897	....	....	6,345
17	Collett to Courthouse	Plaquemines	Oct. 15, 1896	Mar. 3, 1898	2,241	8,910
	Totals				2,241	24,655
	Less amount not comple	ted April 20, 1898			....	5,316
	Work done from April 20,	1896, to April 20,	1898		2,241 or0.42mls	19,339 or3.66mls
			BURAS LEVEE			
18	Tropical Bend	Plaquemines	Oct. 29, 1896	Feb. 24, 1897	3,936	....
19	Buras Section 3	Plaquemines	Oct. 25, 1897	Feb. 7, 1898	4,887	....
	Work done from April 20,	1896, to April 20,	1898		8,823 or1.67mls	....
			CADDO LEVEE			
20	Rush Point	Caddo	Sep. 14, 1896	Nov. 23, 1896	....	11,900
21	Dixie	Caddo	Sep. 14, 1896	Mar. 8, 1897	2,808	11,676
22	Riverdale	Caddo	Nov. 4, 1895	Aug. 7, 1897	5,335	17,458
23	Logie Lea	Caddo	Sep. 25, 1897	....	7,558	....
24	Magnolia	Caddo	Sep. 14, 1896	Dec. 22, 1896	4,815	1,085
	Totals				20,516	42,119
	Less amount done previ	ous to April 20,	1896		4,090	9,193
	Work done from April 20,	1896, to April 20,	1898		16,426 or3.11mls	32,926 or6.23mls

No. 1.—Continued. STATE CONTRACTS.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
DISTRICT				
148,615	14.00	$ 20,806 10	Mississippi Riv.	
69,852	13.90	9,709 42	Bayou Lafourche...	
96,122	12.40	11,919 12	Bayou Lafourche...	
314,589	......	$ 42,434 64		
5,198	......	644 55		
309,391	......	$ 41,790 09		
....	......	....	....	Average price 13.50 cents per cubic yard.
148,615	......	$ 20,806 10		
160,776	......	20,983 99		
309,391	......	$ 41,790 09		
DISTRICT				
44,400	19.75	$ 8,769 00	Mississippi Riv.	
27,800	12.50	3,475 00	Mississippi Riv.	
53,450	10.00	5,345 10	Mississippi Riv.	
125,651	.....	$ 17,589 10		
23,700	......	3,397 50		
101,951	.....	$ 14,191 60		
....	......	....	....	Average price 13.92 cents per cubic yard.
DISTRICT				
24,633	12.50	$ 3,079 12	Mississippi Riv.	
23,576	12.48	2,942 28	Mississippi Riv.	Includes work at Metcalf, Lauderbough, Moizant, Chas. Clinton and Sunrise.
48,209	.. ..	$ 6,021 40		
....	......	....	....	Average price 12.40 cents per cubic yard.
DISTRICT				
32,589	10.20	$ 3,324 07	Red River.......	
79.784	8 89	7,092 79	Red River.......	Includes work at Dixie, Eagle Bend and Kentucky.
105,923	9.74	10,316 90	Red River.......	Includes work at Riverdale, Cash, Brown, Long Branch and Long Point.
95,891	12.90	12,369 94	Red River.......	Includes work at Logie Lea, Pascagoula Pt. and Long Pt., (completed but final certificate not issued).
40,003	7.23	2,892 21	Red River......	
354,190	......	$ 35,995 91		
62,311	......	6,069 09		
291,879	......	$ 29,926 82		
....	.. ...	....	....	Average price 10.25 cents per cubic yard.

APPENDIX A.

STATEMENT

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Contract	New Levee	Enlargement
			BOSSIER LEVEE			
25	Taylor	Bossier	Nov.18,1895	May 4, 1896	3,040	24,645
26	Buck Hall and Cash Point	Bossier	Sep. 14,1896	Nov.13,1896	3,825	5,075
27	Cash Point	Bossier	Sep.21,1897		15,753	4,273
28	Pandora	Bossier	Sep. 14,1896	Feb.26,1897	10,605	4,740
29	Fullilove	Bossier	Mar.19,1898		5,993	
30	Magenta to Knox Point	Bossier	Dec. 2, 1896	Mar.15,1897		21,362
	Totals				39,216	60,095
	Less amounts done previous to April	20, 1896, and not com	pleted April 20,	1998.	8,655	28,148
	Work done from April 20,	1896, to April 20,	1898		30,561 or5.79mls	31,947 or6.05mls
			RED RIVER, ATCHAFALAYA & BAYOU BŒUF			
31	Alexandria	Rapides	Aug.31,1896	Oct. 27, 1896	128	3,495
32	Belleview	Rapides	June23,1897	Sep. 9, 1897	3,548	1,180
33	Cut-off Bayou to Ashton	Rapides	Oct. 26,1896	Jan. 27,1897	521	6,834
34	Slocum and Beaver Dam.	Rapides	Sep. 6, 1897	Dec.31,1897		6,435
35	Overton	Avoyelles	Oct. 26,1896	May24,1897	5,360	5,700
36	Cason	Avoyelles	Sep. 2, 1897	Feb. 9 1898		4,600
37	Home Place	St. Landry	Sep. 6, 1897	Jan. 18,1898		3,213
38	Cap. Gordon	St. Landry	Sep. 2, 1897	Mar. 5,1898		3,176
39	Churchville	St. Landry	Sep. 2, 1897	Dec. 11,1897	1,125	
	Work done from April 20,	1896, to April 20,	1898		10,682 or2.02mls	34,633 or6.56mls
	The above is divided by	streams as foll	ows:			
	On Red River				1.81 mls	4.48mls
	On the Atchafalaya	River.			0.21 mls	2.08mls
	Totals				2.02 mls	6.56mls

No. 1.— Continued.

STATE CONTRACTS.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
DISTRICT				
90,875	9.73	$ 8,954 83	Red River.......	Includes work at Taylor, Willow Bend, and $112.70 repair of banquette.
37,823	9.⅛	3,451 34	Red River.......	
158,000	12.99	20,524 20	Red River.......	Includes work at Cash Pt., Jeters, Colquitt Pt. and Gilmer Lane.
113,132	8.⅛	9,191 97	Red River.	Includes work at Pandora, Benoit Bayou, Sunflower and Hollingsworth.
56,000	6.00	3.360 00	Red River.	Includes work at Fullilove and Nicholson.
54,125	9.48	5,131 05	Red River.	
509,955	.....	$ 50,613 39		
146 000	.....	13,482 40		
363,955	......	$ 37,130 99		
....	......	....	....	Average price 10.19 cents per cubic yard.
LEVEE DISTRICT				
22,849	15.¾	$ 3,605 80	Red River......	Includes work at Alexandria and Sandy Bayou.
44,699	8.19	3,660 85	Red River.......	
49.613	7.00	3,472 91	Red River.......	
18,673	13.00	2.427 49	Red River.......	
75,801	8.73	6,617 42	Red River.......	Includes work at Overton and Sunny Home.
24,723	12.00	2,966 76	Atchafalaya River..	
21,493	10.00	2,149 30	Atchafalaya River..	
15,497	14.¾	2,285 80	Atchafalaya River..	
9,326	11.00	1,025 86	Atchafalaya River..	
282,719	.....	$ 28,212 19		
....	......	....	....	Average price 9.98 cents per cubic yard,
211,680	......	$ 19,784 47		
71,039	......	8,427 72		
282,719	......	$ 28,212 19		

APPENDIX A.

STAMEMENT

RECAPITULATION.

DISTRICT	MILES	
	New Levee	Enlargement
Fifth Louisiana Levee District	2.48	8.39
Atchafalaya Basin Levee District	1.31	.93
Pontchartrain Levee District	.27	1.45
Lafourche Basin Levee District	1.66	2.28
Lake Borgne Basin Levee District	.42	3.66
Buras Levee District	1.67	....
Caddo Levee District	3.11	6.23
Bossier Levee District	5.79	6.05
Red River, Atchafalaya and Bayou Bœuf Levee District	2.02	6.56
Totals	18.73	35.55

No. 1.—Continued. STATE CONTRACTS.

Cubic Yards	Average Price—Cents	Cost	REMARKS
604,201	11.67	$ 70,515 41	
369,653	12.63	46,705 92	
136,323	16.06	22,902 35	
309,391	13.50	41.790 09	
101,951	13.92	14,191 60	
48,209	12.49	6,021 40	
291,879	10.25	29,926 82	
363,955	10.19	37,130 99	
282,719	9.98	28,212 19	
2,508,281	11.85	$ 297,396 77	

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Tensas
1896, to April

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Arkansas City Front	Desha Co., Ark.				1,500
2	Rail Road	Desha Co., Ark.	Oct. 12, 1896			7,459
3	Fulton Lake No. 1	Desha Co., Ark.				1,991
4	Fulton Lake No. 2	Desha Co., Ark.				4,070
5	Panther Forest short line	Chicot Co , Ark.				4,000
6	Charleston	Ouachita	May 11,1896	Aug.17,1896	3,440	4,486
	Totals				3,440	23,506
	Less work not completed April 20, 1898					3,000
	Work done from April 20, 1896, to April 20, 1898				3,440 or0.65mls	20,506 or3.88mls
7	Arkansas Topping, north of Leland, done during the same period					
	The above is divided by streams, as follows:					
	On the Mississippi River					3.03
	On the Ouachita River				0.65	0.85
	Totals				0.65	3.88

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

No. 2. TENSAS BASIN LEVEE DISTRICT.

Basin Levee District, under seven contracts entered into from April 20, 20, 1898.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
6,400	15.	$960 70	Mississippi Riv.	
72,882	17.¾	12,936 55	Mississippi Riv.	Includes work at Rail Road—Fulton Lake.
22,111	22.	4,864 42	Mississippi Riv.	
43,780	22.	9,631 60	Mississippi Riv.	
72,222	23.95	1,729 67	Mississippi Riv.	
35,477	9.45	3,352 58	Ouachita River.	
187,872	. ..	$33,474 82		
32,000	......	7,040 00		
155,872	......	$26,434 82	....	Average price, 16.97 cents per cubic yards.
....	......	4,152 28	. ...	This amount is for work that could not be measured by the cubic yard.
		$30,587 10		
120,395	. ....	27,234 52		
35,477	......	3,352 58		
155,872	......	$30,587 10		

list of dimensions furnished and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Fifth from April 20, 1896,

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Hagaman Banquette	East Carroll		Jan. 5, 1897		610
2	Otter Bayou to Point Lookout	East Carroll	Oct. 5, 1897			14,571
3	Willow Slough Drainage Ditch	Madison		Nov. 6, 1897		
4	Martin Loop Section of Diamond Island Ext'sn	Madison			2,254	
5	Bedford	Madison	Aug 13,1896	Feb.26,1897		4,962
6	Christmas	Madison	Aug.13,1896	Mar.19,1897		22,831
7	Diamond Island	Madison	Aug.11,1896	Jan. 14,1897		21,797
8	Bayou Roundaway	Madison	Aug.13,1896	Oct. 12,1897		10,703
9	Bayou Vidal	Tensas	Sep. 12,1896	Sep. 10,1897		7,764
10	Ion and Woodburn	Tensas	Aug.15,1896	Jan. 22,1898		18,815
11	Somerset	Tensas	Aug.13,1896	Oct. 18,1897		15,636
12	Perkins	Tensas	Aug.13,1896	Aug. 9, 1897		17,600
13	Bland	Tensas	Aug.13,1896	Feb.20,1897		6,000
14	Bland Extension	Tensas				5,100
15	Burn	Tensas	Aug.13,1896	Jan. 4, 1897		6,890
16	Point Pleasant	Tensas	Aug.22,1896	Feb.24,1897		7,777
17	Point Pleasant Extens'n	Tensas		Jan. 14,1898		7,777
18	Buckridge	Tensas	Aug.13,1896	July21,1897		11,751
19	Buckridge Extension	Tensas		April 6,1898	294	
20	Elkridge	Tensas	Aug. 13,1896	Aug. 9, 1897		20,789
21	Elkridge Extension	Tensas		Dec. 17,1897		3,800
22	White Oak Lake	Tensas	Aug.15,1896	Aug.25,1897		18,478
23	White Oak Lake Extension	Tensas		Dec 17 1897		16,882
24	Lake St. Joseph	Tensas	Aug.15,1896	May27,1897		3,992
25	Hardscrable	Tensas	Dec. 22,1896	Sep. 10,1897		11,000
26	Claggett	Tensas	Feb.28,1898			1,213
27	Surget-Ashley	Concordia		May14,1897	4,941	
	Totals				7,489	256,738
	Less work not completed April 20, 1898				2,000	9,384
	Work done from April 20, 1896, to April 20, 1898				5,489 or1.04mls	247,354 or46.84mls

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

No. 3. FIFTH LOUISIANA LEVEE DISTRICT.

Louisiana Levee District, under twenty-seven contracts entered into to April 20, 1898.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
4,012	14.	$561 68	Mississippi Riv.	
114,600	15.	17,190 00	Mississippi Riv.	
10,681	9.½	1,014 69	Mississippi Riv.	
62,946	24.	15,107 04	Mississippi Riv.	
31,390	10.	3,139 00	Mississippi Riv,	
70,427	11.	7,746 97	Mississippi Riv.	
318,395	24.	76,414 80	Mississippi Riv.	
60,247	11.	6,627 17	Mississippi Riv.	
65,033	12.44	8,090 10	Mississippi Riv.	
96,285	10.½	10,109 92	Mississippi Riv	
27,736	11.	3,050 96	Mississippi Riv.	
95,881	16.	15,340 96	Mississippi Riv.	
29,571	12.	3,548 52	Mississippi Riv.	
17,806	12.	2.136 72	Mississippi Riv.	
36,357	11.½	4,181 05	Mississippi Riv	
47,257	11.74	5,547 97	Mississippi Riv.	
20,244	11.74	2,376 64	Mississippi Riv.	
102,962	12.	12,355 44	Mississippi Riv.	
23,024	12.	2,762 88	Mississippi Riv.	
148,704	12.	17,844 48	Mississippi Riv.	
20,524	12.	2,462 88	Mississippi Riv.	
101,012	12.⅞	13,005 29	Mississippi Riv.	
117,349	12.⅞	15,108 68	Mississippi Riv.	
46,228	12.90	5,963 41	Mississippi Riv.	
10,000	37.½	3,750 00	Mississippi Riv.	
29,636	13.	3,852 68	Mississippi Riv.	
27,898	13.	3,626 74	Mississippi Riv.	
1,736,205	....	$262,916 67		
129,009	......	23,457 27		
1,607,196	......	$239,459 40	....	Average price 14.90 cents per cubic yard.

list of dimensions furnished and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Atcha-
April 20, 1896, to April 20, 1898, with three con-

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Merrick	Pointe Coupee		Feb. 14, 1898	2,850	
2	Lucky Hit No. 2	Pointe Coupee	Jan. 1, 1898		3,716	18,150
3	Hart and White (special Atchafalaya)	Pointe Coupee	July 3, 1895	Aug. 14, 1896		33,900
4	Kulhman to Jones	Pointe Coupee	Jan. 13, 1896	June 24, 1896		11,842
5	Morris Bayou	Pointe Coupee				37,000
6	Hart and White		July 3, 1895	Nov. 13, 1897	927 18,187	51,633 11,078 25,633
7	Tanglewood	Pointe Coupee	July 5, 1897	Mar. 9. 1898		11,919
8	Ferguson	Pointe Coupee	Jan. 11, 1897	Feb 16, 1898		4,710
9	Smithland	Pointe Coupee	Feb. 18, 1898			1,290
10	Torwood	Pointe Coupee	June 30, 1897	Jan. 8 1898		8,875
11	Lakeside	Pointe Coupee	July 5, 1897	Dec. 31, 1897		6,400
12	McCullum	Pointe Coupee	June 30, 1897	Feb. 25, 1898		5,000
13	Marioneaux	W. Baton Rouge	Feb. 14, 1898	Mar 21, 1898		2,275
14	Medora to Reliance	Iberville	Sep. 1, 1897	Feb. 28, 1898		6,817
15	Reliance to Turnerville	Iberville	Sep. 10, 1897	Mar. 9, 1898		5 685
16	Plaquemine	Iberville	Sep. 1, 1897			4,045
17	Plaquemine No. 2	Iberville	Dec. 20, 1897	Feb. 11, 1898	788	
18	Fortville	Iberville	Sep. 1, 1897			3,352
19	Fortville and St. Louis	Iberville	July 21, 1897			7,306
20	Tennessee	Iberville	Dec. 15, 1897	Feb. 11. 1898		1,501
21	Evergreen and Rebecca	Iberville	July 21, 1897	Apr. 15. 1898		3,973
22	Olivia	Iberville	July 21, 1897	Jan. 18, 1898		6,756
23	Point Pleasant and St. Raphael	Iberville	July 21, 1897	Nov. 13, 1897		8,880
24	Palo Alto and Dunboyne	Iberville	July 21, 1897	Feb. 10, 1898		9,286
25	Eimer, Harrall and Rice	Iberville	July 21, 1897	Feb. 17, 1898	1,882	3,456
26	Bayou Goula Enlargem't	Iberville	Nov. 9, 1896	Mar. 5, 1897		7,460
27	Hanlon	Iberville	Dec. 8, 1897	Mar. 3, 1898	2,062	
28	Pelico to McManor	Ascension	Sep. 13, 1897	Jan. 8, 1898		5,880
29	McManor to Smoke Bend	Ascension	Mar. 21, 1898			10,588
30	Smoke Bend to Port Barrow	Ascension	Sep. 1, 1897	Jan. 20, 1898	2,441	5,260
31	Klotzville to Napoleonville	Assumption	Jan. 10, 1898			4,300
32	Babin	Lafourche	Sep. 1, 1897		3,696	
33	Lafourche Enlargment	Lafourche Assumption Ascension	Apr. 22, 1896			29,040
	Totals				36,549	353,290
	Less amounts done previous to April 20, 1896, and not completed April 20, 1898				2,725	78,128
	Work done from April 20, 1896 to April 20, 1898				33,824 or 6.40 mls	275,162 or 52.11 mls
	The above is divided by streams as follows:					
	On the Mississippi River				1.53	31.14
	On Bayou Lafourche				3.72	6.61
	On the Atchafalaya River				1.15	14.36
	Totals				6.40	52.11

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named and the cost is obtained by applying the price per cubic yard bid
rred by the Levee Commissioners.

falaya Basin Levee District, under thirty contracts entered into from tracts of earlier date, not completed April 20, 1896.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
35,076	12.98	$ 4,552 86	Atchafalaya River	
107,900	12.⅝	13,622 37	Atchafalaya River	
130.937	scale	19,992 01	Atchafalaya River	
48,615	10.73	5 216 39	Atchafalaya River	Includes work at Kulhman, Means, Smith and Taylor, Jenkins School, Jones.
45,000	16.½	7.425 00	Atchafalaya River	
461,202	scale	63,262 09	Mississippi River	
289 908	scale	26,721 19	Bayou Lafourche	
125,865	scale	11 263 03	Atchafalaya River	
70,132	9.70	6.802 80	Mississippi River.	Includes work at Upper and Lower.
37.295	scale	5,608 82	Mississippi River.	
7.262	15.¾	1,143 76	Mississippi River.	
67 311	10 74	7,229 21	Mississippi River.	
55,953	10 70	5 986 97	Mississippi River.	
64,548	13.98	9,023 81	Mississippi River.	
14,601	13.	1,898 13	Mississippi River.	
46,227	16.75	7,743 02	Mississippi River.	
43,111	11.95	5,151 76	Mississippi River.	
35,438	16 95	6 006 74	Mississippi River.	
18,409	19.	3,497 71	Mississippi River.	
18 247	15.½	2,828 28	Mississippi River.	
68 627	13.95	9.473 46	Mississippi River.	
12 289	15.	1,843 35	Mississippi River.	
28,153	12.95	3,645 91	Mississippi River.	
46,309	10 95	5,070 83	Mississippi River.	
58,400	10.	5,840 00	Mississippi River.	
58 653	11.70	6,862 40	Mississippi River.	
72,912	10.95	7,983 86	Mississippi River.	
25.266	13.40	3.385 64	Mississippi River.	
68,623	21.⅕	14,753 94	Mississippi River,	
57.462	17.40	9,998 39	Mississippi River.	
101,000	13.	13,130 00	Mississippi River.	
105,905	13.¾	14,561 93	Mississippi River.	
35,000	15.¼	5,337 50	Bayou Lafourche.	
60,000	16.45	9,870 00	Bayou Lafourche.	
220,000	16.	35,200 00	Bayou Lafourche.	
2,741,636	......	$361.933 16		
353,766	......	45,750 45		
2,387,870	......	$316,182 71	....	Average price 13.24 cents per cubic yard.
1,590,454	.....	$215.216 49		
488.498	......	63,760 13		
308,918	.....	37,206 09		
2,387,870	......	$316,182 71		

list of dimensions furnished, and estimates made by the Board of State Engineers for for the work, without regard to discount, interest, or other incidental expenses in-

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Pont-
April 20, 1896, to

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Upper District Protection	E. Baton Rouge	Apr. 5, 1898		1,505	
2	Jollisaint	Iberville	Dec. 30,1897	Feb.17,1898		2,800
3	Oakley	Iberville	Dec. 30,1897	Apr. 12,1898		4,233
4	Bagatelle	Iberville	Dec. 30,1897			2,242
5	Arizona to Revenue	Iberville	Dec. 30,1897			7,678
6	Dreyfous	Iberville	Dec. 30.1897	Apr. 11,1898		2 697
7	Landry	Ascension	Dec. 30,1897	Apr. 11,1898		3,360
8	Willow Grove	Ascension	Dec. 30,1897	Apr 11,1898		1.674
9	Gem	Ascension	Dec. 30,1897	Mar 22,1898		1.021
10	Le Blanc	Ascension	Dec. 30,1897	Apr. 11,1898		1,512
11	Jamison	Ascension	Dec. 16,1897	Mar 24,1898		4 661
12	Hermitage and Bocage	Ascension	Dec 30,1897	Mar 22,1898		6,917
13	Nita	St. James	Dec. 30,1897			5,120
14	Belmont	St. James	Dec. 30,1897			1,418
15	St. Elmo	St. James	Feb. 5, 1898			3,800
16	Louque	St. John	Dec. 30,1897	Apr. 11,1898		917
17	Upper Bonnet Carre	St. John	Dec. 30,1897	Apr. 11,1898		3,833
18	Hermitage, Good Hope and Sarpy	St. Charles	Dec. 30,1897			8,245
19	St. Rose Crayfish Hole	St. Charles		Apr. 8, 1898		24
20	Frelsen	St. Charles	Dec. 16,1897	Feb. 17,1898		2,250
21	Hanson City	Jefferson	Nov. 2, 1897	Feb. 25,1898		1,558
	Totals				1,505	65.960
	Less work not completed April 20, 1898				200	5,441
	Work done from April 20, 1896, to April 20, 1898				1,305 or 0.25 mls	60.519 or 11.46 mls

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

No. 5. PONTCHARTRAIN LEVEE DISTRICT.

chartrain Levee District, under twenty-one contracts entered into from April 20, 1898.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
60,000	17.	$10,200 00	Mississippi Riv.	
5,943	18.75	1,114 31	Mississippi Riv.	
12,378	18.75	2,320 87	Mississippi Riv.	
7,200	18.75	1,350 00	Mississippi Riv.	
24,014	18.75	4,502 62	Mississippi Riv.	
5,161	18.75	967 69	Mississippi Riv.	
14,369	18.75	2,694 18	Mississippi Riv.	
20,836	18.75	3,906 75	Mississippi Riv.	
6,205	18.75	1,163 43	Mississippi Riv.	
3,351	18.75	628 31	Mississippi Riv.	
7.716	18.75	1,446 75	Mississippi Riv.	
15,107	18.75	2,832 56	Mississippi Riv.	
17,914	18.75	3,358 87	Mississippi Riv.	
4,724	18.75	885 75	Mississippi Riv.	
10,629	18.75	1,992 93	Mississippi Riv.	
5,737	18.75	1,075 68	Mississippi Riv.	
22,256	18.75	4,173 00	Mississippi Riv.	
27,382	18.75	5.134 12	Mississippi Riv.	
563	17.50	99 22	Mississippi Riv.	
5,775	15.50	895 12	Mississippi Riv.	
33,508	11.88½	3,982 42	Mississippi Riv.	
310,772	......	$54,724 58	....	
23,580	......	$4,333 75	....	
287,192	......	$50,390 83	....	Average price 17.54 cents per cubic yard.

list of dimensions furnished and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the from April 20, 1896, to April 20, 1898, with one

			DATE OF		LINEAR FEET	
Number	NAME OF CONTRACT	PARISH	Contract	Final Certificate	New Levee	Enlargement
1	Wharf to Paytavin.......	Ascension..... .	July 22.1897	Oct. 19, 1897	....	2,390
2	Sim's to Paytavin	Ascension.......	July 22, 1897	Feb. 9, 1898	....	3,125
3	Company Canal to Westwego	Jefferson	Aug. 3, 1897	Feb. 5, 1898	....	1,640
4	Morgan's Wharf to Harvey's Canal..	Jefferson.... ...	Aug. 3, 1897	April 5.1898	....	24,364.
5	Parish Line to Morgan's Wharf..................	Jefferson	Aug. 3, 1897	Feb. 5, 1898	2,865	4,831
6	Concord Run Around.....	Plaquemines....	....	April 4,1898	251	... .
7	Star Enlargement........	Plaquemines.. .	....	Oct. 7, 1897	....	2,415
8	Myrtle Grove (Residence)	Plaquemines....	Sep. 1, 1897	Oct. 7, 1897	634	....
9	Railroad Bridge to wharf.	Ascension.......	July 22, 1897	Feb. 28, 1898	...... {	700 3,565
10	Bayou Lafourche:					
	Section No. 1....	Ascension.......	July 11, 1895	July 13, 1897	1,190	2,380
	Section No. 2....	Assumption.....	....	....	3,660	17,882
	Section o 3....	Assumption. ...	....	. . ..	8,926	8,519
	Section No. 6....	Lafourche	....	....	17,573	13,620
	Section No. 7....	Lafourche	....	....	13,688	2,660
11	Mississippi River and Bayou Lafourche:					
	Section No. 2....	Assumption.....	July 11, 1897	Jan. 28, 1898	8,044	....
	Section No. 3....	Assumption....	....	....	6,671	....
	Section No. 5....	Lafourche	....	....	2,300	130
	Section No. 7....	Lafourche..	....	....	7,877	3,789
	Section No. 9....	Lafourche	....	....	4,452	....
	Section No. 11....	St. Charles......	....	....	2,810	....
12	Mississippi River and Bayou Lafourche No. 2:					
	Section No. 3....	Assumption.....	Jan. 15, 1898	....	1,230	4,032
	Section No. 9....	Lafourche	....	....	837	....
	Totals....				83,008	96,042
	Less work done previous to April 20. 1896				24,873	30,963
	Work done from April 20, 1896, to April 20, 1898				58,135 or 11.01 mls	65,079 or 12.32 mls
	The above is divided by streams as follows:					
	On the Mississippi River				1.24 mls	7.47 mls
	On the Bayou Lafourche				9.77 mls	4.85 mls
	Totals				11.01 mls	12.32 mls

NOTE.—The number of cubic yards given in the foregoing statement is based upon for the levees named, and the cost is obtained by applying the price per cubic yard incurred by the Levee Commissioners.

No. 6. LAFOURCHE BASIN LEVEE DISTRICT.

Lafourche Basin Levee District, under twelve contracts, entered into contract of earlier date not completed April 20, 1896.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
18,025	12.00	$ 2,163 00	Mississippi River.	
15,637	13.¼	2,071 90	Mississippi River.	
12,009	18.00	2,162 71	Mississippi River.	
86,999	24.00	20,879 76	Mississippi River.	Includes work at Morgan's Wharf to Harvey's Canal, Company Canal to Lower Bell Crevasse.
78,153	18.00	14,067 54	Mississippi River.	
1,812	15 00	271 80	Mississippi River.	
3,296	12.00	395 52	Mississippi River.	
6,501	15.00	975 15	Mississippi River.	
3.610	34.¾	1,254 47	Mississippi River.	
43,221	6 & 34.¾	11,951 67	Bayou Lafourche.	
27.837	Scale	2,331 01	Bayou Lafourche.	
106,730	Scale	9,881 76	Bayou Lafourche.	
147,916	Scale	11,284 06	Bayou Lafourche.	
383,699	Scale	34,059 92	Bayou Lafourche.	
256,304	Scale	22,161 11	Bayou Lafourche.	
149,904	Scale	17,953 84	Bayou Lafourche.	
110,023	Scale	13,699 11	Bayou Lafourche.	
41,557	Scale	5,000 82	Bayou Lafourche.	
171,087	Scale	20,917 45	Bayou Lafourche.	
63.136	Scale	7,020 30	Bayou Lafourche.	
86,037	Scale	11,155 00	Mississippi River.	
46,461	Scale	6,340 17	Bayou Lafourche.	
15,538	Scale	2,199 97	Bayou Lafourche.	
1,875,492	.....	$ 220,196 95		
477,433	....	36,398 00		
1,398,059	....	$ 183,798 95		
....	....	....		
312,079	....	$ 55,395 76		
1,085,980	....	128,403 19		
1,398,059	....	$ 183,798 95	....	Average price 13.14 cents per cubic yard.

list of dimensions furnished, and estimates made by the Board of State Engineers, bid for the work, without regard to discount, interest, or other incidental expenses

APPENDIX A. STATEMENT

Levee work undertaken by the Board of Commissioners of the Lake
April 20, 1896, to

Number	NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
			Contract	Final Certificate	New Levee	Enlargement
1	Barracks to Slaughter House	St. Bernard	Jan. 17,1898	Feb. 3,1898	....	698
2	Slaughter House	St. Bernard	Nov.11,1897	Dec. 28,1897	448	....
3	Section 7, Station 2078 plus 54 to 2098	Plaquemines	Oct. 5, 1896	Jan. 15,1897	....	1,980
4	Section 7, Station 2098 to 2140 plus 60	Plaquemines	Oct. 5, 1896	Jan. 15,1897	700	3,485
5	Section 7, Station 2140 plus 60 to 2165	Plaquemines	Oct. 5, 1896	Dec. 26,1896	....	2,240
6	Bohemia to Nestor Canal	Plaquemines	Dec. 18,1897	....	7,299	....
	Totals				8,447	8,403
	Less work not completed April 20, 1898				853	....
	Work done from April 20, 1896, to April 20, 1898				7,594 or1.44mls	8,403 or1.59mls

NOTE.—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid by the Levee Commissioners.

No. 7. LAKE BORGNE BASIN LEVEE DISTRICT.

Borgne Basin Levee District, under six contracts entered into from April 20, 1898.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
407	20.00	$81 40	Mississippi Riv.	
2,366	30.00	709 80	Mississippi Riv.	
6,711	10.45	701 30	Mississippi Riv.	
19,897	10.45	2,079 23	Mississippi Riv.	
11,054	10.45	1,155 14	Mississippi Riv.	
20,490	10.00	2,049 00	Mississippi Riv.	
60,925	....	$6,775 87		
2,390	......	239 00		
58,535	......	$6,536 87		
....	......	....	....	Average price 11.17 cents per cubic yard.

list of dimensions furnished, and estimates made by the Board of State Engineers, for
for the work, without regard to discount, interest, or other incidental expenses incurred

APPENDIX A. STAMEMENT

Levee work undertaken by the Board of Commissioners of the
April 20, 1896, to

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Sec. No. 1 (200 to 269 plus 74)	Plaquemines....	Oct. 21, 1896	Jan. 9, 1897	460	3,435
2	Section No. 3...........	Plaquemines....	Aug. 24, 1897	Feb. 7 1898	1,386	10,625
	Totals	....	.. ..	....	1,846 or 0.35 mls	14,060 or 2.66 mls

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

No. 8. BURAS LEVEE DISTRICT.

Buras Levee District, under two contracts entered into from April 20, 1898.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
13,123	13.4	$1,758 48	Mississippi Riv.	
21,798	14.25	3,106 21	Mississippi Riv.	
34,921	......	$4,864 69		
....	......	....	....	Average price 13.96 cents per cubic yard.

list of dimensions furnished and estimates made by the Board of State Engineers for the work, without regard to discount, interest, or other incidental expenses incurred

APPENDIX A. STATEMENT No. 9. RED RIVER,

Levee work undertaken by the Board of Commissioners of the Red tracts, entered into from April

Number	NAME OF CONTRACT	PARISH	DATE OF Contract	DATE OF Final Certificate	LINEAR FEET New Levee	LINEAR FEET Enlargement
1	Ten Mile Stretch	Avoyelles	Jan. 19, 1898		55,720	
2	Yellow Bayou to Simmsport	Avoyelles	May 1, 1896	Oct. 3, 1896		18,900
3	Neilson	St. Landry	Jan. 5, 1897	Mar. 16, 1897		3,151
	Totals				55,720	22,051
	Less work not completed April 20, 1898				26,900	
	Work done from April 20. 1896, to April 20, 1898				28,820 or5.46mls	22,051 or4.17mls
	The above is divided by streams, as follows:					
	Bayou Des Glaizes				5.46mls	3.57 mls
	Atchafalaya River					0.60 mls
	Totals				5.46mls	4.17 mls

NOTE—The number of cubic yards given in the foregoing statement is based upon the levees named, and the cost is obtained by applying the price per cubic yard bid for by the Levee Commissioners.

ATCHAFALAYA AND BAYOU BŒUF LEVEE DISTRICT.

River, Atchafalaya and Bayou Bœuf Levee District, under three con-
20, 1896, to April 20, 1898.

Cubic Yards	Price—Cents	Cost	STREAM	REMARKS
235,000	8.25	$19,387 50	Bayou Des Glaizes..	
94,232	14.45	13,616 53	Bayou Des Glaizes..	
17,007	11.97	2,035 73	Atchafalaya River..	Includes work at Neilson, Scotland.
346,239	......	$35,039 76		
113,000	......	$9,322 50		
233,239	....	$25,717 26	....	Average price 11.02 cents per cubic yard.
216,232	......	$23,681 53		
17,007	......	2,035 73		
233,239	......	$25,717 26		

list of dimensions furnished and estimates made by the Board of State Engineers for
the work, without regard to discount, interest, or other incidental expenses incurred

APPENDIX A. STATEMENT

The Board of State Engineers is indebted to the courtesy of Captain following statement of "Levees Built and Enlarged by the

NAME OF LEVEE	COUNTY	DATE OF		LINEAR FEET	
		Contract	Final Certificate	New Levee	Enlargement
Cypress Creek ..Sta. 275 to 322	Desha.....	Nov. 6, 1894	May 20,1896	....	....
Sunny Side......Sta....	Chicot.....	July 8, 1895	Mar. 1, 1896	....	....
Sunny Side......Sta.............	Chicot.....	Nov. 2, 1895	Jan. 2, 1896	....	....
Banquette above Ark. City . ....Sta.............	Desha.....	Nov. 2, 1895	Aug. 20, 1896	....	8,800
Levee in Ark....Sta. 0 to 120	Desha....	Dec. 14, 1896	Nov. 15, 1897	....	12,000
Levee in Ark....Sta. 1080 to 1200	Chicot.....	Dec. 14, 1896	....	....	12,000
Levee in Ark....Sta. 1510 to 1630	Chicot.....	Dec. 14, 1896	Dec. 2, 1897	....	12,000
Levee in Ark....Sta. 1630 to 1730	Chicot.....	Dec. 14, 1896	Nov. 18, 1897	....	10,000
Levee in Ark....Sta. 2316 to 2488	Chicot.....	Dec. 14, 1896	Aug. 31, 1897	....	17,200
Levee in Ark....Sta. 2488 to 2562	Chicot.....	Dec. 14, 1896	Aug. 25, 1897	......	7,400
Levee in Ark....Sta. 3484 to 3499	Chicot.....	Dec. 14, 1896	Sep. 13, 1897	....	900
Levee in Ark....Sta. 3760 to 3945	Chicot.....	Dec. 14, 1896	Oct. 1, 1897	....	18,700
Levee in Ark....Sta. 3945 to 4110	Chicot. ...	Dec. 14 1896	Mar. 2, 1898	....	16,500
Levee in Ark....Sta. 4110 to 4208	Chicot.....	Dec. 14, 1896	Oct. 29, 1897	....	19,900
Levee in Ark....Sta. 120 to 250	Desha.....	Sep. 10, 1897	Jan. 10, 1898	740	12,260
Levee in Ark....Sta. 180 to 230	Desha. ...	Sep. 10, 1897	....	....	5,000
Levee in Ark....Sta. 1810 to 1941	Chicot. ...	Sep. 10, 1897	....	....	13,100
Levee in Ark....Sta. 3065 to 3100	Chicot.....	Sep. 10, 1897	....	....	3,500
Levee in Ark....Sta. 420 to 484	Desha.....	Aug. 14, 1897	....	....	6,400
Levee in Ark....Sta. 630 to 660	Desha.....	Aug. 14, 1897	....	....	3,000
Levee in Ark....Sta. 780 to 800	Desha.....	Aug. 14, 1897	....	....	2,000
Levee in Ark....Sta. 1490 to 1510	Chicot.....	Aug. 14, 1897	....	....	2,000
Levee in Ark....Sta. 1740 to 1780	Chicot.....	Aug. 14, 1897	....	....	4,000
Levee in Ark....Sta. 3160 to 3185	Chicot.....	Aug. 14, 1897	....	....	2,500

No. 10. UNITED STATES LEVEES.

H. C. Newcomer, Corps of Engineers, United States Army, for the United States, in the Upper Tensas Basin Levee District."

Cubic Yards — Earthwork	Price—Cents	Cost	REMARKS
32,599	13.00	$5,635 81	Includes retained percentage $1,821.73. Linear feet in last report.
5,608	8.48	1,243 19	Includes retained percentage $767.63. Linear feet in last report. Informal proposals.
1,171	8.48	99 30	Linear feet in last report. Informal proposals.
48,054	7.⅓	3.604 05	
45,829	12.½	5,728 63	Amos Bayou Line.
75,856	13 99	10 612 25	Not Finished. Estimated yardage in levee 108,000.
98,092	13.73	13,468 03	
66,711	19.7	13,142 05	
102,547	17.9	18,355 91	
55,466	22.⅜	12,410 51	
15.277	25.00	3,806 75	
87.798	13.33	11,703 46	
93,871	15.00	14,080 65	
58,441	14.⅞	8,693 10	
59,345	15 00	8,901 75	Amos Bayou Line.
14,838	13.00	1,929 20	Not finish'd. Estimated yard'ge in levee 22,000
85,435	16.00	13,669 60	Not finish'd. Estimated yard'ge in levee 160.000
....	14.00	.. ..	Estimated yardage in levee... .... 42,000 not begun.
....	13.½	....	Infor'al Pro. Estimated yard'ge in levee 56,000 not begun.
....	12 00	....	Infor'al Pro. Estimated yard'ge in levee 31,000 not begun.
....	10.00	....	Infor'al Pro. Estimated yard'ge in levee 15,000 not begun.
. ...	14.⅜	....	Infor'al Pro. Estimated yard'ge in levee 19,000 not begun.
....	15.9	....	Infor'al Pro. Estimated yard'ge in levee 64,000 not begun.
....	15.00	....	Infor'al Pro. Estimated yard'ge in levee 19,000 not begun.

APPENDIX A. STATEMENT

The Board of State Engineers is indebted to the courtesy of Captain
following statement of "Levees Built and Enlarged by the

NAME OF CONTRACT	PARISH	DATE OF		LINEAR FEET	
		Contract	Final Certificate	New Levee	Enlargement
Louisiana Bend..Sta. 0 to 190	E. Carroll.	July 8, 1895	May 1, 1896	....	....
Bunch's Bend....Sta. 255 to 755	E. Carroll.	July 8, 1895	July 31, 1896	....	....
Benham to Elton.Sta. 1190 to 1436	E. Carroll.	July 8, 1895	Apr. 1, 1896	....	....
Atherton to Stamboul........ Sta. 2090 to 2263	E. Carroll.	July 8, 1895	Apr. 1, 1896	....	....
Upper Wilton...Sta. 2263 to 2411	E. Carroll.	July 8, 1895	Apr. 8, 1896	....	....
Upper Buckhorn.Sta. 3118 to 3261	Madison...	July 8, 1895	Apr. 1, 1896	....	....
Delta ....Sta. 4176 to 4325	Madison...	July 8, 1895	May 23, 1896	....	....
O'Brien ....Sta. 4325 to 4410	Madison..	July 8, 1895	July 31, 1896	....	....
Salem Banquette Sta. 2530 to 2620	E. Carroll.	June 6, 1896	Oct. 20, 1896	....	9,000
Villa Vista.. ....Sta. 2870 to 3030	Madison...	June 6, 1896	Oct. 20, 1896	....	16,000
Milliken's Bend Sta. 3365 to 3547	Madison...	June 6 1896	Nov. 6, 1896	....	16,900
Reid ....Sta. 4526 to 4620	Madison...	June 6, 1896	Nov. 24, 1896	....	13,525
Levee in La......Sta. 0 to 256	E. Carroll.	Dec. 14, 1896	....	....	25,600
Levee in La......Sta. 756 to 851	E. Carroll.	Jan. 18, 1897	Jan. 7, 1898	....	9,530
Levee in La......Sta. 851 to 930	E. Carroll.	Dec. 14, 1896	Sep. 30, 1897	....	7,960
Levee in La.,....Sta. 1459 to 1636	E. Carroll.	Dec. 14, 1896	Dec. 1, 1897	....	17,100
Levee in La......Sta. 2286 to 2367	E, Carroll.	Dec. 14, 1896	Aug. 28, 1897	....	8,200
Levee in La......Sta. 3328 to 3428	Madison. .	Sep. 10, 1897	....	....	10,000
Levee in La.. ...Sta. 3428 to 3550	Madison...	Sep. 10, 1897	....	....	2,200
Levee in La......Sta. 4409 to 4432	Madison...	Sep. 10, 1897	....	....	2,300
Levee in La......Sta. 4507 to 4540	Madison...	Sep 10 1897	....	....	3,700
Levee in La......Sta. 4551 to 4570	Madison...	Sep. 10, 1897	....	....	1,900
Levee in La......Sta. 4432 to 4452	Madison...	Aug. 14, 1897	....	2,000	....
Levee in La.,....Sta. 4452 to 4472	Madison...	Aug. 14, 1897	....	2.000	....
Levee in La......Sta. 4472 to 4492	Madison...	Aug. 14, 1897	....	2,000	....
Levee in La......Sta. 4492 to 4507	Madison...	Aug. 14, 1897	....	1,500	....
Levee in La.. ...Sta. 4540 to 4551	Madison...	Aug. 14, 1897	....	1,130	....

No. 11.

UNITED STATES LEVEES.

H. C. Newcomer, Corps of Engineers, United States Army, for the United States in the Upper Tensas Basin Levee District."

Cubic Yards	Price—Cents	Cost	REMARKS
16,245.6	9 ½	$ 1 786 26	Includes retained percentage $ 242.93. Total linear feet in last report.
103,928.4	9.¾	11,970 66	Includes retained percentage 1,386.26. Total linear feet in last report.
19,278.3	8.70	2,145 02	Includes retained percentage 467.81. Total linear feet in last report.
13,839.6	9.91	2.016 52	Includes retained percentage 645.02. Total linear feet in last report.
11,314.	14.00	2,057 05	Includes retained percentage 473.09. Total linear feet in last report.
14.249.7	11.91	2,506 33	Includes retained percentage 809.19. Total linear feet in last report.
3,012.	8.17	353 68	Includes retained percentage 107.60. Total linear feet in last report.
8,760.4	10.½	1,474 90	Includes retained percentage 555.06. Total linear feet in last report.
23,842.7	8.41	2,005 17	Informal proposals.
37,836.3	8.47	3,204 73	Informal proposals.
32,735.8	8.47	2.772 72	Informal proposals.
32,794.5	15.91	5.217 60	Informal proposals.
163,923.4	12.4	20,376 07	Retained percentage still due, $2,037.57,
62.277.5	15.00	9,341 62	
53,618 3	10.74	5,758 59	
92.250.5	10.44	9,630 92	
64,046.4	10 74	6,878 55	
....	12.½	....	Estimated yardage in Levee 112.000. Not begun.
....	11.74	....	Estimated yardage in Levee 105,200.
....	18.2	....	Estimated yardage in Levee 35,000. Not begun.
....	23.00	....	Estimated yardage in Levee 40 000. Not begun.
....	19.½	....	Estimated yardage in Levee 35,000. Not begun.
77.810.	27.½	21,397 74	Estimated yardage in Levee 107,000. Informal proposals. Not finished.
87.568.	27.½	24.081 19	Estimated yardage in Levee 107,000. Informal proposals. Not finished.
63.414.	27.½	17,438 84	Estimated yardage in Levee 110,000. Informal proposals. Not finished.
71,625.	27.½	19,696 87	Estimated yardage in Levee 89,000. Informal proposals. Not finished.
39,301.	36.75	14.443 11	Estimated yardage in Levee 83,000. Informal proposals. Not finished.

APPENDIX A. STATEMENT No. 12.

UNITED STATES LEVEES.

The Board of State Engineers is indebted to the courtesy of Capt. George McC. Derby, Corps of Engineers, United States Army, for the following Statement of Levees built and enlarged by the United States in the Fourth District, Improving Mississippi River, from opposite Warrenton, Miss., to Head of Passes, from April 20, 1896, to April 20, 1898.

Number	NAME OF LEVEE	Miles below Cairo	Length of Line	New or Enlargement	Work Completed	Total Yardage	Price per Cubic Yard—Cents	Total Cost
	Lower Tensas District. 1896-1897.							
	Hard Times—Wilson	632	6,600	Enlarg'nt.	July 20, 1896	8,790.68	11.70	$1,028 51
	Evergreen, Section 1	637	1.660	Enlarg'nt.	Mar. 29, 1897	21,013.23	9.43	1,981 55
	Evergreen, Section 2	637	1,200	Enlarg'nt.	Mar. 16, 1897	15,592.45	9.43	1,470 37
	Evergreen, Section 6	637	1,200	Enlarg'nt.	Jan. 5, 1897	16,550.01	9.43	1.560 67
	Evergreen, Section 7	637	1,200	Enlarg'nt.	Jan. 18, 1897	15,479.34	9.43	1,459 70
	Bondurant, Section 1	642	3,448	Enlarg'nt.	Feb. 20, 1897	31,881.28	9.25	2,949 02
	Bondurant, Section 2	642	3,600	Enlarg'nt.	Mar. 9, 1897	30,147.24	9.25	2,788 62
	Winter Quarters, Section 7	640	2,752	Enlarg'nt.	Mar 18, 1897	28,774.61	13.98	4,022 69
	Harpers, Section 1	651	6,359	Enlarg'nt.	Mar 18, 1897	43,553.60	8 60	3,745 61
	Cottage Home, Section 2	650	3,941	Enlarg'nt.	Dec. 22. 1896	31,016.55	10.49	3,253 64
	Rifle Point, Section 4	687	4,447	Enlarg'nt.	Feb. 11, 1897	44,054.47	9.00	3,964 90
	Moro	709	4,507	Enlarg'nt.	Mar. 3. 1897	38,719.04	8.50	3,291 12
	1897-1898							
	Evergreen, Section 3	637	1,300	Enlarg'nt.	Oct. 25, 1897	15,648.13	9.43	1,475 62
	Evergreen, Section 4	637	1,300	Enlarg'nt.	Oct. 25, 1897	16,364.39	9.43	1,543 17
	Evergreen, Section 5	637	1,100	Enlarg'nt.	Nov. 4, 1897	16,039.90	9.43	1,512 56
	Evergreen, Section 8	637	1,147	Enlarg'nt.	Dec. 7, 1897	16.810.72	9.43	1,585 25
	Winter Quarters, Section 1	640	2,853	Enlarg'nt.	Nov. 18, 1897	39,087.13	14.50	5,667 64
	Winter Quarters, Section 2	640	2,800	Enlarg'nt.	Dec. 20, 1897	39,456.29	15.50	6,115 72
	Bondurant, Section 3	642	7,670	Enlarg'nt.	Dec. 21, 1897	48,106.08	8.50	4,089 02
	Cottage Home, Section 1	650	3,970	Enlarg'nt.	Sep. 8, 1897	36,111.82	10.49	3,788 13
	Harpers, Section 2	651	11,517	Enlarg'nt.	Sep. 23, 1897	78,551.14	14.00	10,997 16
	L'Argent	665	....	New	part completed,	90,626.40	14.40	13,050 21
	L'Argent to Gibson, Sec. 1	680	870	Enlarg'nt.	Feb. 11, 1898	15,285.67	12.45	1,903 06
	L'Argent to Gibson, Sec. 2	680	700	Enlarg'nt.	Dec. 28, 1897	14,795.21	13.50	1.997 35
	L'Argent to Gibson, Sec. 3	680	800	Enlarg'nt.	Nov. 17, 1897	12,482.50	12.45	1,554 07
	L'Argent to Gibson, Sec. 4	680	1,000	Enlarg'nt.	Oct. 20, 1897	15,577.19	12.45	1,939 36
	L'Argent to Gibson, Sec. 5	680	900	Enlarg'nt.	Jan. 18, 1898	15,402.38	12.45	1,917 59
	L'Argent to Gibson, Sec. 6	680	800	Enlarg'nt.	Nov 30, 1897	14,211.28	12.45	1,769 31
	L'Argent to Gibson, Sec. 7	680	900	Enlarg'nt.	Nov. 26, 1897	15,205.73	13.95	2,121 20
	L'Argent to Gibson, Sec. 8	680	800	Enlarg'nt.	Oct. 20, 1897	13,947.90	13.95	1,945 73
	L'Argent to Gibson, Sec. 9	680	700	Enlarg'nt.	Nov. 30, 1897	14,556.18	13.95	2.030 59
	L'Argent to Gibson, Sec. 10	680	700	Enlarg'nt.	Dec. 28, 1897	15,665.66	13.95	2,185 36
	L'Argent to Gibson, Sec. 11	680	700	Enlarg'nt.	Feb. 11, 1898	17,198.54	13.95	2,399 20
	L'Argent to Gibson, Sec. 12	680	800	Enlarg'nt.	Feb. 15, 1898	16,609.48	13.95	2,317 02
	Delhi, Section 1	680	800	Enlarg'nt.	April 4, 1898	15,496.72	13.00	2,014 57
	Rifle Point, Section 3	689	4,200	Enlarg'nt.	Mar. 11. 1898	35,864.10	9.00	3,207 77
	Morville	710	4,942	Enlarg'nt.	Dec. 13, 1897	28,335.76	8.50	2,408 54
	Morville to Greens	712	4,651	Enlarg'nt.	Dec. 20, 1897	25,758.05	9.90	2,550 05
	Esperanza, Section 5	715	900	Enlarg'nt.	Apr. 1, 1898	16,111.61	19.50	3,141 76
	Esperanza, Section 7	715	800	Enlarg'nt.	Feb. 28, 1898	15,038.88	19.90	2,992 73
	Esperanza, Section 8	715	700	Enlarg'nt	Feb. 5, 1898	14,284.60	19.90	2,842 63
	Esperanza, Section 9	715	800	Enlarg'nt.	Apr. 4. 1898	15.061.36	19.90	2.997 21

STATEMENT No. 12.—Continued.

Number	NAME OF LEVEE	Miles below Cairo	Length of Line	New or Enlargement	Work Completed	Total Yardage	Price per Cubic Yard—Cents	Total Cost
	Lower Tensas Dist.—Cont'd. 1897-1898.							
	Esperanza, Section 11........	715	800	Enlarg'nt.	Jan. 17,1898	13,743.05	19.00	$ 2,611 18
	Esperanza, Section 12........	715	900	Enlarg'nt.	Apr. 11,1898	14.685 54	19.00	2 790 26
	Esperanza, Section 14........	715	1,000	Enlarg'nt.	Apr. 11,1898	14,730.90	19.00	2,798 88
	Esperanza, Section 20.... ...	715	767	Enlarg'nt.	Mar. 18,1898	9,265.71	13.70	1,269 40
	Esperanza, Section 21....	715	1,200	Enlarg'nt.	Feb. 16,1898	15,082 55	13.70	2.066 31
	Esperanza, Section 23	715	1.300	Enlarg'nt.	Mar. 18,1898	16,706.85	13.70	2,288 84
	Esperanza, Section 24	715	1,300	Enlarg'nt.	Jan. 24,1898	16,231.40	13.70	2.236 03
	Ashley to Fairview, Sec. 1...	825	....	Enlarg'nt.	part completed.	15,000.00	10.00	1,500 00
	Ashley to Fairview, Sec. 7...	725	3,000	Enlarg'nt.	Dec. 21,1897	18,006.44	10.00	1,800 64
	Ashley to Fairview, Sec. 8...	725	3,261	Enlarg'nt.	Dec. 21,1897	14,384.46	9.24	1,329 12
	Fairview......	728	1,052	New.	Feb. 12,1898	8,718.29	10.24	892 75
	Glasscock....	725	1,526	New.......	Apr. 11,1898	44,314.94	20.00	8,862 98
	Atchafalaya District. 1896-1897.							
1	Smithland....................	766	981	Enlarg'nt.	Nov. 28,1896	6,756.86	12.00	810 82
2	Ennis to Smithland, Sec. 1..	767	5,300	Enlarg'nt.	Sep. 15,1896	26,320.54	8.45	2,224 08
3	Ennis to Smithland, Sec. 2..	767	5,100	Enlarg'nt.	July 27,1896	25,534.01	8.45	2,157 63
4	Ennis to Smithland, Sec. 3..	767	4,900	Enlarg'nt.	July 2,1896	25,325.54	8.45	2,140 00
5	Ennis to Smithland Sec. 4..	767	4,800	Enlarg'nt.	July 27,1896	26,798.04	8.45	2 264 44
6	Raccourci to Longw'd, Sec. 1	783	2,000	Enlarg'nt.	Oct. 13,1896	15,130.09	8.00	1,210 41
7	Raccourci to Longw'd, Sec. 2	783	2,000	Enlarg'nt.	Oct. 16,1896	13,396.18	8.00	1,071 70
8	Raccourci to Longw'd, Sec. 3	783	2.000	Enlarg'nt.	Nov. 28,1896	15,791.27	8.00	1,263 30
9	Raccourci to Longw'd, Sec. 4	783	2,000	Enlarg'nt.	Jan. 15,1897	18,245.19	8.00	1,459 62
10	Raccourci to Longw'd, Sec. 5	783	2,000	Enlarg'nt.	Feb. 16,1897	16,352.32	8.00	1,308 19
11	Raccourci to Longw'd, Sec. 10	783	2,000	Enlarg'nt.	Nov. 30,1896	9,443.88	9.00	849 95
12	Raccourci to Longw'd, Sec. 11	783	2,000	Enlarg'nt.	Nov. 30,1896	10,193.11	9.00	1,162 38
13	Raccourci to Longw'd, Sec. 12	783	2,000	Enlarg'nt.	Nov. 30,1896	8,719.30	9.00	820 47
14	Raccourci to Longw'd, Sec. 13	783	2,000	Enlarg'nt.	Dec. 16.1896	12,578.95	9.00	1,132 11
15	Raccourci to Longw'd, Sec. 14	783	1,812	Enlarg'nt.	Dec. 16,1896	11,335.52	9.00	1,020 09
16	Poche to Morganza, Sec. 1..	787	3,300	Enlarg'nt.	Nov. 28.1896	30 533.95	16.00	4,885 43
17	Poche to Morganza, Sec. 2..	787	3,300	Enlarg'nt.	Oct. 13,1896	29 586.81	12.00	3,550 42
18	Poche to Morganza, Sec. 5..	787	3,362	Enlarg'nt.	Nov. 17,1896	43,514.83	14.00	6,092 08
19	Fanny Richie................	794	3,112	Enlarg'nt.	Dec. 2,1896	27,072.86	8.00	2,165 83
20	Pointe Coupee, Section 1....	797	1,800	Enlarg'nt.	Mar. 13,1897	19,390.20	13.50	2.617 68
21	Pointe Coupee, Section 2 ...	797	1,900	Enlarg'nt.	Mar. 13,1897	15 406.27	11.00	1,694 69
22	Pointe Coupee. Section 3....	797	2,400	Enlarg'nt.	Sep. 22,1896	14.886.07	9.00	1.339 75
23	Pointe Coupee, Section 4....	797	2.475	Enlarg'nt.	Sep. 2, 1896	19,024.84	8.50	1,617 11
24	Alaska to Lakeland, Sec. 2.	802	4,200	Enlarg'nt.	Aug. 25,1896	26 336.72	7.73	2,035 83
25	Alaska to Lakeland, Sec. 3..	802	4,200	Enlarg'nt.	Aug. 25,1896	26,983.07	7.73	2 085 79
26	Alaska to Lakeland, Sec. 4..	802	4.700	Enlarg'nt.	July 27,1896	27,006.27	7.73	2 087 59
27	Alaska to Lakeland, Sec. 5..	802	5,300	Enlarg'nt.	July 2, 1896	27,762.14	7.73	2,146 01
28	Stonewall................	805	4,127	Enlarg'nt.	Dec. 22,1896	13.755.85	8.45	1.162 37
29	St. Claude	806	3,800	Enlarg'nt.	Sep. 19,1896	30.789.33	8.45	2,601 70
30	Grand Bay.	807	4,400	Enlarg'nt.	Oct. 8.1896	28,189.13	10.50	2,959 86
31	Highland to Wildwood, Sec. 1	812	3,300	Enlarg'nt.	July 22,1896	20,952 72	10.90	2,283 85
32	Highland to Wildwood, Sec. 2	812	2,900	Enlarg'nt.	July 22,1896	21,351.35	10.90	2.327 30
33	Highland to Wildwood, Sec. 8	812	3,200	Enlarg'nt.	Nov. 2,1896	24,726.27	19.00	4,697 99
34	Highland to Wildwood, Sec. 9	812	5.615	Enlarg'nt.	Oct. 8,1896	30,490.08	11.00	3,353 91
35	Belle Vale to Allendale, Sec. 1	825	2,200	Enlarg'nt.	Aug. 3, 1896	20,281.51	9.90	2,007 87
36	Belle Vale to Allendale, Sec. 2	825	2,100	Enlarg'nt.	Sep. 16.1896	20,175.00	9.90	1.997 33
37	Belle Vale to Allendale, Sec. 3	825	2.438	Enlarg'nt.	Sep. 16,1896	20,441.25	9.90	2,023 68
38	Viola to Belmont, Section 1..	827	2,300	Enlarg'nt.	June 19,1896	20,980.41	9.90	2.077 06
39	Viola to Belmont, Section 2..	827	2,200	Enlarg'nt.	June 19,1896	19,890.19	9.90	1,969 12
40	Viola to Belmont, Section 3..	827	1,400	Enlarg'nt.	June 19,1896	20,375.40	9.90	2,017 16
41	Evan Hall	883	936	Enlarg'nt.	July 3,1896	5,038.70	8.50	428 29

STATEMENT No. 12.—Continued.

Number	NAME OF LEVEE	Miles below Cairo	Length of Line	New or Enlargement	Work Completed	Total Yardage	Price per Cubic Yard—Cents	Total Cost
	Atchafalaya Dist.—Cont'd. 1896-1897.							
42	Smoke Bend	885	4.189	Enlarg'nt.	July 3,1896	14,194.62	8.50	$ 1,205 77
43	Red River Landing	765	7.400	Enlarg'nt.	Dec. 16,1896	61,670.93	24.00	14,801 02
44	Poche to Morganza, Sec. 3	787	3,400	Enlarg'nt.	Mar.20,1897	36,939.97	14.00	5,171 59
	1897-1898							
	Raccourci	783	3.700	Enlarg'nt.	Sep. 4,1897	35,136.52	12.00	4,216 38
	Morrison, Section 5	793	988	Enlarg'nt.	Dec. 3,1897	18,779.72	13.75	2.582 21
	Morrison, Section 6	793	900	Enlarg'nt.	Dec. 28,1897	17,867.81	13.75	2,456 82
	Morrison, Section 8	793	1.100	Enlarg'nt.	Feb. 1,1898	18,909.49	13.75	2,600 05
	Pointe Coupee, Section 1	796	941	Enlarg'nt.	Feb. 1.1898	14,769.05	13.75	2,030 74
	St. Francis Church, Sec. 1	799	890	Enlarg'nt.	Feb. 15,1898	15,740.44	16.65	2,620 78
	St. Francis Church, Sec. 2	799	1,000	Enlarg'nt.	Mar.26,1898	14,885.67	16.65	2,478 46
	St. Francis Church, Sec. 3	799	1,100	Enlarg'nt.	Mar.26,1898	14,340.20	16.65	2,387 64
	St. Francis Church, Sec. 4	799	900	Enlarg'nt.	Mar.26.1898	14,960.49	16.65	2,490 92
	St. Francis Church, Sec. 5	799	1,100	Enlarg'nt.	Mar.26,1898	15,507.71	16.65	2,582 03
	St. Francis Church, Sec. 6	799	1,286	Enlarg'nt.	Jan. 17,1898	16,152.88	16.65	2,689 45
	St. Claude	805	....	Enlarg'nt.	part completed.	15,000.00	16.25	2,437 50
	Pontchartrain District. 1896-1897							
	Gartness	836	3 214	Enlarg'nt.	Nov. 2,1896	28,180.15	10.00	2,818 01
	Laurel	839	2,308	Enlarg'nt.	Sep. 16,1896	14,776.34	8.35	1,233 82
	Laurel Extension	839	1,200	Enlarg'nt	Oct. 27,1896	5,955.96	8.35	497 29
	Conrad	840	2,700	Enlarg'nt.	Oct. 21,1896	17,179.38	8.35	1,431 41
	Conrad Extension	840	1,067	Enlarg'nt.	Oct. 27,1896	5,785.82	8.35	483 12
	Woodstock Extension	848	235	Enlarg'nt.	July16 1896	581.31	9.00	52 32
	Benkin	851	3,361	Enlarg'nt.	Jan. 5,1897	16,963.83	10.00	1,696 39
	Willow Glen	861	8,336	Enlarg'nt.	Aug. 11,1896	26.455.08	9.00	2,380 95
	St. Gabriel	862	1,007	Enlarg'nt	Aug. 11,1896	4,490.38	11.50	516 39
	Virginia	863	2,422	Enlarg'nt.	Feb 15,1897	14,245.05	10.25	1,460 12
	Bowden, Section 1	880	2,080	Enlarg'nt.	July 29,1896	11,151.74	8.00	892 14
	Bowden, Section 2	880	4,400	Enlarg'nt.	July 29,1896	13,981.15	8.00	1,118 49
	Dicharry	882	5,897	Enlarg'nt.	Sep. 21,1896	51,423.33	10.00	5,142 33
	Canti	882	2,938	Enlarg'nt.	Oct. 21,1896	19,236,62	10.40	2,000 61
	Canti Extension	882	1,858	Enlarg'nt.	Oct. 13,1896	10,015,43	10 40	1,041 60
	Riverton	889	2,400	Enlarg'nt.	Nov. 17,1896	19,584.15	8.74	1,711 65
	Burnside	891	2,144	Enlarg'nt.	Dec 2,1896	12,376.86	8.35	1,033 47
	Union	893	3 264	Enlarg'nt.	Feb. 15,1897	15,201.63	8.73	1,327 11
	Lillie	900	1,995	Enlarg'nt.	Dec. 21,1896	12,412.44	9.25	1,148 15
	Watson	918	3,746	Enlarg'nt.	Aug. 6 1896	18,895.62	10.20	1,927 35
	Hope	919	4,524	Enlarg'nt.	Aug. 6,1896	9,447.51	10.20	963 65
	Reserve	921	7,537	Enlarg'nt.	July 6.1896	28,730.96	8.50	2,442 13
	Cornland	923	1,593	Enlarg'nt.	July 2,1896	4,199.98	10.20	428 40
	Prospect, upper	935	4 051	Enlarg'nt.	Aug. 12,1896	15,176.22	8.50	1,289 98
	Prospect, lower	937	2,356	Enlarg'nt.	Sep. 15,1896	7,186.29	10.00	718 63
	Morgan	947	3 661	Enlarg'nt.	Jan. 19,1897	17,109.36	10.00	1,710 94
	Edgewater	947	1,389	Enlarg'nt	Feb. 23,1897	5,531.55	10.94	605 15
	Sauve	950	5,200	Enlarg'nt.	Dec. 28,1896	36,748.08	9.00	3,307 33
	Boisblanc	952	4,076	Enlarg'nt.	Feb. 4,1897	15,063.91	10.50	1,581 71
	Soniat, lower	953	1,057	Enlarg'nt.	Oct. 16,1896	6,244.75	10.00	624 48
	La Freniere	953	1,800	Enlarg'nt.	Oct. 21,1896	11,925.57	10.00	1,192 56
	1897-1898.							
	Section 1	835	1,349	Enlarg'nt.	Apr. 6,1898	15,774.21	14.50	2,887 26
	Section 2	835	1,751	Enlarg'nt.	Mar.21,1898	15,657.29	14.50	2,270 31

STATEMENT No. 12.—Continued.

Number	NAME OF LEVEE	Miles below Cairo	Length of Line	New or Enlargement	Work Completed	Total Yardage	Price per Cubic Yard—Cents	Total Cost
	Pontchartrain Dist.—Cont'd. 1897-1898.							
	Section 3	835	1,690	Enlarg'nt.	Jan. 6,1898	19,506.22	13.50	$ 2,633 34
	Section 4	836	1,433	Enlarg'nt.	Dec. 27,1897	15,786.33	13.00	2,052 22
	Section 5	836	1,717	Enlarg'nt.	Feb.10,1898	19,407.90	13.00	2,523 02
	Section 6	836	1,253½	Enlarg'nt.	Dec.29,1897	17,158.28	17.00	2,916 90
	Section 8	836	1,946	Enlarg'nt.	Nov.15,1897	21,088.64	17.00	3,585 07
	Section 23	840	2,045	Enlarg'nt.	April 6,1898	24,490.08	10.99	2,801 36
	Section 27	840	2,063	Enlarg'nt	Dec. 13,1897	28,336.98	10.99	3,114 24
	Section 28	843	1,526	Enlarg'nt.	Mar.24 1898	16,988.35	10.99	1,867 02
	Section 29	843	1,432	Enlarg'nt.	Feb.10.1898	18,202.67	10.99	2,000 47
	Section 31	843	1,310	Enlarg'nt.	Dec. 20,1897	14,725.66	10.99	1,618 35
	Section 32	844	1,301	Enlarg'nt.	Jan. 17,1898	13,094.88	10.99	1,439 48
	Section 33	844	1,204	Enlarg'nt.	Feb.23,1898	11,699.47	10.99	1,285 77
	Section 36	845	1,224	Enlarg'nt.	Dec.13,1897	9,984.56	10.99	1,097 80
	Section 37	846	1,391	Enlarg'nt.	Dec.28 1897	12,406.77	10.99	1,363 50
	Section 38	846	1,242	Enlarg'nt.	Mar.31,1898	11,474.58	10.99	1,261 06
	Section 39	846	1,072	Enlarg'nt.	Feb.10,1898	10,573.87	10.99	1,162 07
	Section 40	846	1,022	Enlarg'nt	Feb.10,1898	8,732.36	10.99	959 69
	Conrad	839	1,728	New	Apr. 6,1898	38,680.46	14 00	5,415 26
	Gomez, Section 1	855	1,500	New	Aug. 7,1897	21,906.60	8.15	1,785 39
	Gomez, Section 2	855	1.573	New	Aug.16,1897	22,445.66	7.92	1,777 70
	Tippecanoe	894	4,861	Enlarg'nt.	Aug.26,1897	22,553.60	8 40	1,894 50
	Whitehall	896	590	Enlarg'nt.	Aug.26,1897	2,666.77	8.45	225 34
	Lafourche District. 1896-1897.							
	Peytavin	887	2,800	Enlarg'nt.	Nov.28,1896	11,574.43	9.89	1,144 71
	Sections 7. 8. 9 and 10	887	5,746	Enlarg'nt.	Mar.18,1897	13,139.41	9.⅓	1,226 35
	Sections 30, 31, 32 and 33	893	5,173	Enlarg'nt.	Mar.18,1897	13,552.30	9.⅓	1,264 88
	Point Pleasant	893	5,228	Enlarg'nt.	Mar.24,1897	21,110.69	9.89	2,087 82
	Sections 36, 37, 38 and 39	895	4,277	Enlarg'nt.	Mar. 6,1897	13,763.86	9.⅓	1,284 63
	La Pice	895	3,400	Enlarg'nt.	Mar. 8,1897	12,480.44	9.89	1,229 17
	St. James Church	902	5.900	Enlarg'nt.	July 22,1896	25,947.05	10.00	2,594 71
	St. James Estate	902	4,242	Enlarg'nt.	July 6,1896	17,600.15	10.90	1,918 42
	Homes Place to Pike's Peak.	905	3,793	Enlarg'nt.	Aug.27,1896	12.363.11	9.89	1,222 71
	Valcour Aime, Section 1	909	4,100	Enlarg'nt.	Jan. 21,1897	17,659.82	9.89	1,746 56
	Valcour Aime, Section 2	909	4,100	Enlarg'nt.	Nov.17,1896	16,117.35	9.89	1,594 00
	Star to Killona, Section 1	932	3,900	Enlarg'nt.	Oct. 13,1896	19,560.93	9.89	1,934 58
	Star to Killona, Section 2	932	3,900	Enlarg'nt.	Oct. 13,1896	20,139.76	9.89	1,991 82
	Ashton	940	2,844	Enlarg'nt.	Mar. 6,1897	15,011.59	10.70	1,606 24
	Lone Star	941	3,227	Enlarg'nt.	Oct. 8,1896	14,143.57	10.70	1,513 36
	Fairfield, Section 1	955	3,800	Enlarg'nt	Dec.26,1896	27,134.41	10.70	2,903 38
	Fairfield, Section 2	955	4,084	Enlarg'nt.	Dec.26,1896	26,677.00	10.70	2,854 44
	Columbia Garden. Section 1.	959	6,000	Enlarg'nt.	Sep.16,1896	30,989.88	10.70	3,315 91
	Davis to Lone Star, Section 2	944	3,655	Enlarg'nt	Dec. 4,1896	23,676 00	13.00	3,077 88
	1897-1898.							
	Sections 11, 12, 13	888	3,354	Enlarg'nt.	Aug.12,1897	12,663.67	9.33	1,181 95
	Sections 21, 22, 23	892	4,407	Enlarg'nt.	Aug.12,1897	13.376 09	9.33	1,248 43
	Sections 24, 25, 26	892	3,285	Enlarg'nt.	Aug.12,1897	13,866.97	9.33	1,294 25
	Bonsecour	903	4,500	Enlarg'nt.	Aug.13,1897	14,406.37	9.89	1,424 79
	White Rose	920	1,617	Enlarg'nt.	Oct. 23,1897	8,527.77	9.89	843 39
	Lake Borgne District. 1896-1897.							
	Slaughterhouse extension	968	2,394	Enlarg'nt.	Nov.18,1896	4,253.56	14.00	595 49
	Roy	970	6,530	Enlarg'nt.	Mar.12.1897	9,591.41	12.50	1,196 43

STATEMENT No. 12.—Continued.

Number	NAME OF LEVEE	Miles below Cairo	Length of Line	New or Enlargement	Work Completed	Total Yardage.	Price per Cubic Yard—Cents	Total Cost
	Lake Borgne Dist.—Cont'd. 1896-1897.							
	Belair	996	4,573	Enlarg'nt.	Mar. 8,1897	7,559.79	11.40	$ 861 81
	Fairview No. 2	996	2.074	Enlarg'nt.	Aug.14,1896	10 842.64	11.25	1,219 79
	Fairview No. 3	997	4,200	Enlarg'nt.	Jan. 25.1897	5,655.49	11 40	644 72
	Bonsejour	997	480	Enlarg'nt.	Dec.28.1896	675.34	13.00	87 80
	Monsecour	999	1,397	Enlarg'nt.	Aug.27,1896	3,474.71	11.00	382 22
	St. Sophie to Harlem	1003	1,300	Enlarg'nt.	Mar. 9 1897	2,151.79	11.75	252 84
	Harlem	1003	3,890	Enlarg'nt.	Mar. 9,1897	5,244.88	11.75	616 27
	1897-1898.							
	Story to Caenarvon, Sec. 1	975	2,186	Enlarg'nt.	Mar.29,1898	9,439.95	14.45	1,364 08
	Story to Caenarvon, Sec. 2	976	4,400	Enlarg'nt.	Mar.29,1898	25,030.95	14.45	3,616 83
	Story to Caenarvon, Sec. 5	977	1,600	Enlarg'nt.	Feb. 2.1898	7,489.97	12 50	936 25
	Story to Caenarvon, Sec. 6	977	2,125	Enlarg'nt.	Apr. 1,1898	8,967.00	12.50	1,120 88
	St. Clair	982	....	Enlarg'nt.	part completed.	15,051.23	11.40	1,715 84
	Greenwood	990	4,852	Enlarg'nt.	Mar.30,1898	14,486.20	11.40	1,651 42
	Woodlawn	992	7,984	Enlarg'nt.	Oct. 30,1897	10,937.17	11.40	1,246 84
	Barataria District. 1896-1897.							
	Bruslard to Belle Chasse, 1	981	10,323	Enlarg'nt.	Oct. 31,1896	15,999.56	13.25	2,119 94
	Bruslard to Belle Chasse, 2	983	8,035	Enlarg'nt.	Dec.14,1896	15,814.29	13.25	2,095 39
	Concord	985	5,478	Enlarg'nt.	Jan. 27,1897	10,187.02	13 00	1,324 31
	Cedar Grove	989	5,056	Enlarg'nt.	Oct. 21,1896	6,413.21	11.00	705 45
	Oakville	990	4,344	Enlarg'nt.	Nov.18,1896	10,457.03	11.00	1,150 27
	Oakville	990	2,660	Enlarg'nt.	Mar. 6,1897	6,839.36	11.50	786 53
	Jesuits Bend	992	1,424	Enlarg'nt.	Dec.16,1896	2,827.34	11.00	311 01
	Dobard	992	1,233	New	Dec.16,1896	13,695.54	11.00	1,506 51
	Toccoa	995	3,198	Enlarg'nt.	Jan. 23,1897	4,874 75	11.00	536 22
	Ironton	1000	2,905	Enlarg'nt	Nov.17,1896	4,100.70	11.30	463 38
	Woodpark	1002	3,612	Enlarg'nt.	Oct. 21,1896	12,420.32	11 30	1,403 50
	Woodpark to Deer Range	1003	6,264	Enlarg'nt.	Dec.26,1896	15,308.70	12.50	1,913 58
	Deer Range	1004	700	Enlarg'nt.	Dec. 26,1896	983 58	11.30	111 14
	Pte. Celeste	1007	1,196	Enlarg'nt.	Nov.17,1896	1.034.81	11.30	116 94
	Pte. Celeste to Woodland	1008	12,900	Enlarg'nt.	Oct. 2,1896	30,259.27	13 85	4,190 91
	Woodland	1010	1,356	Enlarg'nt.	Oct. 21,1896	1,358.48	11.30	153 51
	Diamond	1010	2,231	Enlarg'nt	Aug. 4,1896	7.842.46	13.45	1,054 81
	Friends' Store	1014	1,937	Enlarg'nt.	Dec.16.1896	6,298.20	11.30	711 69
	Barthelemy	1015	1,957	Enlarg'nt.	Dec.16,1896	4,416.07	11.30	499 02
	Barthelemy to Riceland	1015	4,300	Enlarg'nt.	Dec.11,1896	9,095.27	11.98	1,089 61
	1897-1898.							
	Belle Chasse to St. Ann	984	3,582	Enlarg'nt.	Aug. 7,1897	3.298.77	13.00	428 84
	St. Ann to Concession	985	4,957	Enlarg'nt.	Aug. 7,1897	6,209.07	13.00	807 18
	Ballay to Orange Farm—							
	Section 1	1022	2,269	New	Feb.12,1898	15,897.39	11 25	1,788 45
	Section 2	1022	2,465	Enlarg'nt.	Feb.12,1898	11,529.41	11.25	1,297 06
	Section 6	1022	1,610	New	Apr.11,1898	15,342.48	14.25	2,186 31
	Section 7	1022	2,100	New	Apr.11,1898	22,081.64	14.25	3,146 63

APPENDIX A. STATEMENT

Approximate quantity and cost of levee work in the several Levee
from April 20, 1896, to April 20, 1898, by the Districts,

LOCALITY	BY WHOM DONE	MILES OF	
		New Levee	Enlargement
Arkansas— Desha and Chicot Counties	Tensas Basin Levee District	....	3.03
	United States	0.14	31.39
	Totals	0.14	34.42
Louisiana— Tensas Basin Levee District	District	0.65	0 85
Fifth Louisiana Levee District	District	1.04	46.84
	State	2.48	8.39
	United States	2.11	45.75
	Totals	5.63	100.98
Atchafalaya Basin Levee District	District	6.40	52.11
	State	1.31	.93
	United States	....	28.55
	Totals	7.71	81.59
Pontchartrain Levee District	District	0.25	11.46
	State	0.27	1.45
	United States	0.99	24.10
	Totals	1.51	37.01
Lafourche Basin Levee District	District	11.01	12.32
	State	1.66	2.28
	United States	0.23	35.17
	Totals	12.90	49.77
Orleans Levee District	....	1.05	22.91
Lake Borgne Basin Levee District	District	1.44	1.59
	State	0.42	3.66
	United States	....	9.46
	Totals	1.86	14.71

No. 13. SUMMARY ACCORDING TO DISTRICTS.

Districts of Louisiana and in Desha and Chicot Counties, Arkansas, State and United States, as shown in foregoing statements.

Cubic Yards	Average Price per Cubic Yard—Cents.	Cost	REMARKS
120.395	16.97	$ 27,234 52	The cost includes $4,152.28, for work not paid for by the cubic yard.
946,938	15.53	147,084 24	
1,067,333	15.94	174,318 76	
35,477	9.45	3,352 58	
1,607,196	14.90	239,459 40	
604,201	11.67	70,515 41	
2,363,895	14.58	344,576 51	
4,575,292	14.30	654,551 32	
2,387,870	13.24	316,182 71	
369,653	12 63	46,705 92	
1,171,717	11.76	137,872 25	
3,929,240	12.65	500,760 88	
287,192	17.54	50,390 83	
136,323	16.06	22,902 35	
875 599	10.81	94,714 30	
1,299,114	12.93	168,007 48	
1,398.059	13.14	183,798 95	
309,391	13.50	41,790 09	
605,216	10.90	65,984 12	
2,312,666	12.60	291,573 16	
700,955	20.57	144,247 94	No tabulated statement.
58.535	11.17	6.536 87	
101,951	13.92	14,191 60	
140,852	12.43	17.509 51	
301,338	12.68	38,237 98	

APPENDIX A. STAMEMENT

LOCALITY	BY WHOM DONE	MILES OF New Levee	MILES OF Enlargement
Buras Levee District	District	0.35	2.66
	State	1.67	....
	United States	1.13	0.47
	Totals	3.15	3.13
Caddo Levee District	State	3.11	6.23
Bossier Levee District	State	5.79	6.05
Red River, Atchafalaya and Bayou Bœuf Levee District	District	5.46	4.17
	State	2.02	6.56
	Totals	7.48	10.73
RECAPITULATION.			
Districts		27.65	157.94
State		18.73	35.55
United States		4.60	174.89
Totals		50.98	368.38

No. 13.—Cont'd. SUMMARY ACCORDING TO DISTRICTS.

Cubic Yards	Average Price per Cubic Yard—Cents	Cost	REMARKS
34,921	13.96	$ 4,864 69	
48,209	12.49	6,021 40	
64,851	12.98	8,418 45	
147,981	13.04	19,304 54	
291,879	10.25	29,926 82	
363,955	10.19	37,130 99	
233,239	11.02	25,717 26	
282,719	9.98	28,212 19	
515,958	10.45	53,929 45	
6,863,839	... .	$ 1,001,785 75	
2,508,281	... .	297,396 77	
6,169,068	....	816,159 38	
15 541,188	....	$ 2,115,341 90	

APPENDIX A. STATEMENT

Approximate quantity and cost of levee work in the several Levee from April 20, 1896, to April 20, 1898, by the Districts,

STREAM	LOCALITY	BY WHOM DONE	MILES	
			New Levee	Enlargement
Work on Mississippi River in Arkansas	Tensas Basin	District		3.03
		United States	0.14	31.39
	Totals		0 14	34.42
Work on Mississippi River in Louisiana	Fifth Louisiana	District	1.04	46.84
		State	2.48	8.39
		United States	2.11	45.75
	Atohafalaya Basin	District	1.53	31.14
		State	0.93	0 93
		United States		28.55
	Pontchartrain	District	0.25	11.46
		State	0 27	1.45
		United States	0.99	24.10
	Orleans	District	1.05	22.91
	Lake Borgne	District	1.44	1.59
		State	0.42	3.66
		United States		9.46
	Buras	District	0.35	2.66
		State	1.67	
		United States	1.13	0.47
	Lafourche Basin	District	1.24	7.47
		State	0.84	
		United States	0.23	35.17
	Totals		17.97	282.00
Red River	Caddo	State	3.11	6.23
	Bossier	State	5.79	6.05
	R. R., A. & B. B.	State	1.81	4.48
	Totals		10.71	16.76
Atchafalaya River	Atchafalaya Basin	District	1.15	14.36
	R. R., A. & B. B.	District		0.60
		State	0.21	2.08
	Totals		1.36	17.04
Bayou Lafourche	Atchafalaya Basin	District	3.72	6.61
		State	0.38	
	Lafourche Basin	District	9.77	4.85
		State	0.82	2 28
	Totals		14.69	13.74

No. 14. SUMMARY ACCORDING TO STREAMS.

Districts of Louisiana, and in Desha and Chicot Counties, Arkansas, State and United States, as shown in foregoing statements.

Cubic Yards	Cost	REMARKS
120,395	$27,234 52	
946,938	147,084 24	
1,067,333	$174,318 76	
1,607,196	$239,459 40	
604,201	70,515 41	
2,363,895	344,576 51	
1,590,454	215,216 49	
324,259	40,918 19	
1,171,717	137,872 25	
287,192	50,390 83	
136,323	22,902 35	
875,599	94,714 30	
700,955	144,247 94	
58,535	6,536 87	
101,951	14,191 60	
140,852	17,509 51	
34,921	4,864 69	
48,209	6,021 40	
64,851	8.418 45	
312,079	55,395 76	
148,615	20,806 10	
605,216	65,984 12	
11,177,020	$1,560,542 17	
291,879	$29,926 82	
363,955	37,130 99	
211,680	19,784 47	
867,514	$86,842 28	
308,918	$37,206 09	
17,007	2,035 73	
71,039	8,427 72	
396,964	$47,669 54	
488,498	$63,760 13	
45,394	5.787 73	
1,085,980	128,403 19	
160,776	20,983 99	
1,780,648	$218,935 04	

APPENDIX A. STATEMENT No. 14.—Con-

STREAM	LOCALITY	BY WHOM DONE	MILES New Levee	MILES Enlargement
Bayou Des Glaizes.....	R. R., A. & B. B...	District..........	5.46	3.57
Ouachita River.........	Tensas	District..........	0.65	0.85

RECAPITULATION.

	New Levee	Enlargement
On the Mississippi River (in Arkansas)........................	0.14	34.42
On the Mississippi River (in Louisiana).......	17.97	282.00
On the Red River............	10.71	16.76
On the Atchafalaya River...	1.36	17.04
On the Bayou Lafourche...........	14.69	13.74
On the Bayou Des Glaizes...........	5.46	3.57
On the Ouachita River.	0.65	0.85
Totals..	50.98	368.38

tinued.

SUMMARY ACCORDING TO STREAMS.

Cubic Yards	Cost	REMARKS
216,232	$23,681 53	
35,477	$3,352 58	
1,067,333	$174,318 76	
11,177,020	1,560,542 17	
867,514	86,842 28	
396,964	47,669 54	
1,780,648	218.935 04	
216,232	23,681 53	
35,477	3,352 58	
15,541,188	$2,115,341 90	

APPENDIX B.

Sundry Reports of Board of State Engineers to Boards of Levee Commissioners.

APPENDIX B.

SUNDRY REPORTS OF BOARD OF STATE ENGINEERS TO BOARDS OF LEVEE COMMISSIONERS.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., July 10, 1896.

Col. T. G. Sparks, President Atchafalaya Basin Levee District,
Port Allen, La.:

Dear Sir—In your letter of June 18th, addressed to Mr. A. Perrilliat, member of the Board of State Engineers, you requested us to investigate and be prepared to report answers to the following questions:

1st. "Is the Sewall dike at the foot of Poland street in New Orleans a success?"

2d. "Will the dike at Bayou Goula be a success; or, can piling be put down as Sewall uses it, to stand?"

In preparing an answer to these we have carefully gone over the ground of the dike at Poland street in New Orleans, and of the one at Bayou Goula, and we have endeavored to get all of the information regarding said dikes which has been gathered in the past by the United States Government and by the Orleans Levee Board.

We will state that the dike at the foot of Poland street, which was built about the month of March, 1894, is 194 feet long, extending to a depth of some fifty-five feet of water, as referred to the high water plane of 1893. Soundings were taken on the site of this dike before its construction, on February 20th, 1894, and after its construction, on June 28th, 1894, and on July 6th, 1896. These soundings, which were taken both above and below the dike, and also some 140 feet beyond it into the stream, are represented on the accompanying chart, marked "A.". They show that the dike falls very far short of extending to the foot of the steep sloping bank; that on either side of the dike some deposit has been formed, but that at the extreme end of the dike, some erosion has taken place, and that out in the stream, beyond the dike, the effect has been nil, as the bank preserves, approximately, its original slope.

We will further state, that since the time of building said dike no caving has occurred in that neighborhood, but that at the same time no caving of any importance has occurred anywhere else on the lower Mississippi River; for it is a well-known fact that maximum caving occurs after years of maximum flood heights, and we have had no great flood height since the building of this dike, and there has been little or no caving there, or anywhere else.

A close examination shows that the lower portion of said dike, near the low water line, has cracked and pulled apart, showing a tendency of the bank to slide out into the stream. These various cracks, which have been measured, aggregate about eighteen inches, showing that the slight motion in the mass of earth in the caving direction, has pulled apart the piles at their lower extremity.

To us it appears that the construction of the Poland street dike is not fruitful of conclusive results, as that dike has been constructed right in the midst of a reach where the United States Government has built numerous spur-dikes; there being four of these below the Sewall dike and four others above it; and in addition to these, a number of mattresses, all of them extending far out into the stream, some 450 feet, or about 250 further out than the Sewall dike, and to a depth seventy feet greater than that to which the Sewall dike extends Therefore, should any prevention from caving be accomplished at that point, it will be natural to expect that the more extensive and far-reaching work of the United States Government, which has been done in this locality, would be the cause of the check, rather than the Sewall dike. Map "B," appended to this report, shows the Poland street reach; the various spur-dikes and mattresses built up to date being represented thereon, and the Sewall dike being also represented at the letter "C."

At Bayou Goula, one spur dike was built in August, 1894. This dike was originally 254 feet long and extending to a depth of 118 feet, referred to the high water plane of 1893, but during the comparatively mild flood of 1895, sixty-four feet of it was broken and wrenched off, leaving the dike now only 190 feet in length.

I attach to this report a communication to Capt. Derby of the United States Engineers, submitted by one of his assistants, describing the construction of said dike and its condition on February 7th, 1895. Said appendix is marked "D."

It must be borne in mind, in the discussion of this dike, that it was never submitted to the action of the usual flood height; it only had against it the moderate high waters of 1895 and 1896; one of which, however, was sufficient to break off part of it. There has been no caving in the neighborhood of Bayou Goula since the building of the dike; nor has there been any caving of any extent anywhere else on the lower Mississippi River during the same period. It would, therefore, not be conclusive to ascribe this absence of caving to the influence of the dike. Soundings were taken on the upper and lower side of the dike on September 26th, 1894, February 26th, 1895. and July 8th, 1896. At the same time soundings were taken on ranges 200 feet above the dike, and 100 feet below it. These are represented on the plan, hereunto attached, and marked "E." An examination of them will show that immediately on either side of the dike the bank has been growing gradually steeper during this period and at the extreme river end of the dike, the soundings of February 26th, 1895, show considerable scouring, and those of July 8th, 1896, show considerable scouring at the end left standing after the broken piece had been carried away. Moreover, these soundings show that out in the stream, beyond the end of the dike for some 250 feet, the bank has been growing gradually steeper during this period. In other words, no perceptible result can be discovered which would tend to prevent caving at that point, when erosion has made the banks sufficiently steep for them to fall in.

Plan "F," hereunto attached, shows the details of the construction of the dike at Bayou Goula, while at the bottom of it a section of the river is shown with the dike represented on it. It will be seen that this dike extends about 170 feet from the edge of the bank, while, in order for it to reach the lowest point of the slope, and be, therefore, fully effective, it should go some 375 feet from the bank; or, say, 200 feet further than it extends at present.

In conclusion, we would state that, while in our belief, the spur dike system, properly constructed and carried out (that is, substantial in construction, sufficiently numerous, and extending out a sufficient distance into the stream to cover the steep slope of the bank) is adapted to check caving in the Mississippi River bends, we do not think that the Sewall dikes, as now built, are efficient for that purpose, for the following reasons:

1st. They have to extend to great depths, amounting in some cases, such as at Bayou Goula, to 140 feet of water, and it is not practicable to drive piles to that depth so that 140 feet of timber shall stand with firmness out of the ground.

2d. These dikes should extend out a considerable distance into the stream, and it is beyond the possibility of the strength of timber to construct a solid wall of wood—be it two feet in thickness—that will be exposed to the impact of the current for a length of some 400 feet, and an average height of, say seventy-five feet; such a wall would be inevitably broken off or wrenched off; or, if an attempt were made to brace it, or tie it, even were it successful, its cost would be so great as to make it much more expensive than the usual and more satisfactory methods of building spur-dikes followed by the United States Government.

We believe the Sewall piling to be a most excellent system of piling for many purposes, but as far as an examination of the Poland street dike and the Bayou Goula dike is concerned, no beneficial results can be shown to have been derived from them; while on the contrary, this examination reveals that with a higher flood height, and therefore a swifter current, the dikes would probably be carried away.

We beg to state that this opinion is shared by the majority of engineers of repute, with whom we have discussed the matter.

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per Arsene Perrilliat,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., February 1, 1897.

To Col. T. G. Sparks, President Atchafalaya Basin Levee District,
Port Allen, La.:

Dear Sir—In accordance with the request of the Atchafalaya Basin Levee District that the State funds alloted to your district be spent in the construction of a levee at Hickey, where the present levee is insufficient in height and section, and threatened by caving, we beg to report that we have had careful surveys and examinations made of the ground and river bank at that point, and have ascertained the following facts, which are illustrated by the accompanying map:

The bank at Lower Hickey has receded at the point in question, since 1866 (a period of thirty odd years), from 600 to 1,000 feet. At its nearest point it is now nearly 100 feet from the center of the crown of the present levee. For the last few years no marked caving has appeared on that stretch, but it is so located that violent caving may be expected there after any great flood water. This, joined to the fact that the present levee is below our standard of height and section and situated on very low ground, renders it necessary, in our judgment, to undertake a new levee at that point.

We have staked out a carefully located line there, indicated in dotted red on the accompanying blue print. It is 4,868 feet long, has an average height of nineteen feet, and contains nearly 218,000 cubic yards, estimating it with an eight foot crown, and three and three to one slopes. It has a variable distance from the river bank of from 800 to 950 feet, and from the existing levee of from 500 to 850 feet.

We deem, from the great height of this levee, its consequent great cost, the caving tendency of the bank, and the particular location of this stretch, which makes it a most disastrous place should a crevasse occur there, that the location above outlined should be recommended by us as the proper location for your Board to accept.

If your honorable Board will adopt the location thus recommended, and will provide right of way to the State and its contractors to build the same, and will also undertake to complete any part of the line for which the means of the State may be insufficient, we are willing to recommend the expenditure of such State funds as may be available for the construction of the work, and are prepared to advertise and let it out as soon as we hear from you on the subject.

Very respectfully yours,

THE BOARD OF STATE ENGINEERS,
Per Arsene Perrilliat,
Assistant State Engineer.

PORT ALLEN, LA., April 6, 1897.

To Col. T. G. Sparks, President Atchafalaya Basin Levee District,
Port Allen, La.:

DEAR SIR—In accordance with the request of the Atchafalaya Basin Levee District, I examined yesterday, in company with Mr. Honore Dugas, a member of the Board of Commissioners of said district, the private levee in front of Mr. Emile St. Martin's Pellico plantation, in the parish of Ascension.

I find that on said plantation a private levee has been built on the batture, covering some three thousand feet of State levee, and therefore preventing the river water from coming against said State levee.

This private levee, which I examined thoroughly, is of insufficient grade and section, and will in all probability be unable to stand the pressure which the coming flood is going to exert against it. During the floods of 1892 and 1893, this private levee proved inadequate, and gave way. It is well known to your Board, and to all levee authorities, that in flood times it is very desirable that the water should rise gradually and slowly against the levees. The reason of this is obvious, as the gradual rise of the water against the levee causes even settling of the earth, and develops slowly any weak points which might exist in the levee, while the absence of this premonitory sign might occasion a crevasse before time could be had to apply the proper remedy. The history of the past shows that some of the most disastrous crevasses occurred from the fact that a front or old levee had been maintained too long, and when it had finally given away, the water had come against the main or back levee with such suddenness as to cause it to break. For the above reasons, I deem that the existence of this private levee at Pellico is a source of danger to the State levee, and when it breaks, it will increase considerably the chances of a crevasse in the main levee, thereby doing great injury to one of the richest and most fertile sections of your district.

I, therefore, consider it my duty, considering the magnitude of the interests involved, to advise that you take no chances whatsoever in the matter, and that the water be let in through the private levee against the main levee as soon as possible.

Very respectfully submitted by
THE BOARD OF STATE ENGINEES,
Per ARSENE PERRILLIAT,
Assistant State Engineer.

PORT ALLEN, LA., April 12, 1897.

To the Honorable President and Members of the
Atchafalaya Basin Levee District Board, Port Allen, La.:

GENTLEMEN—I beg to submit to your honorable body the following report on the condition of the Hickey levee in the parish of West Baton Rouge.

This levee, behind part of which a new levee is now building, is 7,800 feet long, and ranges in height from two and one-half to four feet above the highest water of the past. The upper end of the levee is generally higher than the lower end. This levee stood the water of 1893, but had to have some addition to its top made then. Since that time it has been capped with a temporary earthern enlargement having a five-foot crown and slopes of two and two to one. This capping was made with the material at hand, which is generally pretty sandy and has washed down to about a four-foot crown and slopes somewhat steeper than two to one. The levee is very dry, showing no signs of leakage, but is, near its top, of very thin section, and, moreover, very much exposed to wave-wash. It has already been attacked by the waves, and required considerable protection during storms, which are very violent in that locality. I consider this levee the weakest one in your chain of levees, and one which might become very dangerous when the water has risen three or four feet more, as every indication seems to point that it will. I would suggest that this levee be protected at once with a thoroughly substantial revetment, from one end to the other. That this revetment be braced thoroughly so as to stand heavy waves, and be also thoroughly sacked at its bottom. That later on, if the top of the levee shows any signs of weakness, the space between the revetment and the levee be filled with loose earth and sacked earth.

I would suggest especially that the work should be prosecuted with vigor and in a workmanlike manner, from now on, so that every chance might be on your side in holding this very important levee.

Very respectfully yours,

ARSENE PERRILLIAT,

Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 14, 1897.

To the Honorable T. G. Sparks, and to the Members of the Board of Commissioners of the Atchafalaya Basin Levee District,
Port Allen, La.:

GENTLEMEN—On the occasion of the call-meeting of your Board, to take place on June 14th, 1897, I beg to submit to your honorable body the following report on the high water season of 1897 in your district, and to make some few remarks on the present condition of your leveees, accompanied by suggestions for future work.

The flood of 1897 was the highest on record in your district, at all points, except on the Atchafalaya River at Melville. The excess of the flood height over the high waters of the past varies at different points and will be enumerated in tables to be found below. In the discussion of this flood period it is advisable to treat separately the three streams which constitute your district front.

On the Mississippi River, from Barbre's Landing to Donaldsonville, you have a line of levees 128 miles in length. These levees had been raised and enlarged subsequently to 1893 so that the entire line was nowhere less than two and one-half feet above the highest flood of the past. In many instances your district had built levees three, four and five feet above the highest water of the past. These higher grades were to be found mostly in the upper part of your district, and especially in Pointe Coupee parish; therefore, it will be seen that the greatest marginal height was to be found at the upper end of your district. The following table gives the high water of 1897 and the date on which it occurred; also, the highest waters of the past and the year of their occurrence, for the leading points of your Mississippi River front. In the column marked difference, is to be found the excess of the 1897 water over those of the past. I wish to add that the elevations given are referred to "Cairo datum," which is the plane of reference universally adopted now in speaking of elevations on the Mississippi Rlver.

MISSISSIPPI RIVER.

	HIGH WATER, 1897.		HIGH WATER OF PAST		DIFFERENCE
	DATE	C. D.	YEAR	C. D.	
Barbre's Landing	May 13-14	75.17	1882	74.07	1.1 feet.
Red River Landing.........	13-15	74.05	1892	72.72	1.33 feet.
Bayou Sara......................	14-15	67.75	1892	66.20	1.55 feet.
Baton Rouge	13-14	60.71	1892–3	58.51	2.20 feet.
Plaquemine.....................	14	57.31	1893	54.86	2.45 feet.
Donaldsonville	13-17	52.54	1893	50.34	2.2 feet.

The examination of the foregoing table shows that at Red River Landing, the head of your district, the water of 1897 was 1.33 feet above the highest water of the past, and at Donaldsonville, the lower end of your district, the water was 2.2 feet above the highest past water, while in between, at Plaquemine, the difference between the highest waters was as much as 2.45 feet. It will be seen, therefore, that the greatest flood height was experienced in the lower end of the district, the very portion where the grades were lowest, and, therefore, which rendered the high water fight more intense in that locality.

On Bayou Lafourche your line of levee is 74.5 miles in length. In the past, the levees from Donaldsonville to Lafourche Crossing had been raised and enlarged to a grade three feet above the highest water of the past, with the exception of, perhaps, some two miles of levees, which, being in small towns, it was found difficult to enlarge to quite that standard. From Lafourche Crossing down to the lower end of your system, however, no systematic work of enlargement had been undertaken, and, therefore, there were a great many very bad and low levees to be found. In fact, the only levees in that section which were able to stand the great flood which you had, without strenuous exertions, were those scattering pieces which had been enlarged, mostly by the State, since 1890. It was, therefore, to be expected that a tremendous high water fight would be experienced below Lafourche Crossing. This took place, and after the most strenuous exertions, on April 15th, at 2 o'clock in the afternoon, a crevasse took place at Babin's, about a mile and a quarter below Lafourche Crossing. It must be said, however, that before this, on March 29th and April 1st, two crevasses had already taken place on the opposite or east bank of Bayou Lafourche, at Jaundran and Leblanc, respectively. These two crevasses relieved the strain of the waters from St. Mary Pamela's Church down to the lower end of the system; subsequently to these crevasses, the water, although again rising considerably, never reached the point which it had attained before they broke.

The crevasse at Babin's, which, on May 25th, measured 317 feet in width, relieved the strain of the water as high up as Labadieville, and, after its occurrence, the water, as far up as that point, again rose considerably, but did not reach the same stage which it had attained before the breaking of this levee.

From Labadieville to Donaldsonville the highest water was reached on or about the same date as the highest mark was reached on the river. The following table gives the highest water of this year at the leading points on Bayou Lafourche, the date of same, the highest water of the past, and the difference between the two waters. The figures given are also referred to "Cairo datum."

BAYOU LAFOURCHE.

	HIGH WATER, 1897.		HIGH WATER OF PAST		DIFFERENCE
	C. D.	DATE	C. D.	YEAR	
Paincourtville.....	49.5	May 15	47.2	1893	2.3 feet.
Napoleonville	47.9	May 14	46.1	1893	1.8 feet.
Labadieville	45.2	April 15	43.2	1893	2.0 feet.
Thibodaux	43.8	April 15	42.0	1891	1.8 feet.
Lafourche Cr's'ng	43.2	April 15	41.56	1891	1.74 feet.
Raceland.............	41.3	April 1	39.9	1891	1.4 feet.
Lockport.............	39.2	April 1	38.4	1891	0.8 feet.

An inspection of the above table shows that the greatest flood height was experienced on the upper part of the bayou—that part which had been especially prepared by the raising and enlarging in the past. It must also be said that we have no means of approximating what height the water would have reached on the lower bayou had not the crevasses occurred, as the Babin's crevasse took place when the water at Donaldsonville was only at 49.64 "C. D.," or 2.9 feet below the maximum height reached at Donaldsonville.

On the Atchafalaya River your levee line is 30.2 miles in length.

The work done in the past had raised and enlarged the levees from Barbre's Landing to Simmsport to a grade from two to three and one-half feet above the highest water of the past. From Simmsport to

Humphrey's Bayou the levees had been raised and enlarged to a grade three and one-half feet above the highest water of the past; and from Humphrey's Bayou to Melville the levees had been built to a grade of three feet above 1893 water. The following table gives the high water of this year on the Atchafalaya River, the date on which it occurred; also the highest water of 1893, at the main points of said river, and the difference between these two waters.

ATCHAFALAYA RIVER.

	1897		1893	DIFFERENCE
Simmsport	73.39	May 14-15	70.92	2.47 feet.
Marine Bayou	70.4	May 15-16	68.2	2.2 feet.
Lake Bayou	65.9	May 15-16	63.5	2.4 feet.
Morris Bayou	62.5	May 15-16	59.7	2.8 feet.
Melville	56.27	May 15-16	55.17	1.1 feet.

It will be seen that the high water of the Atchafalaya exceeded that of 1893 by as much as two feet and eight-tenths at the Morris Bayou, and an examination of the high water profile of this river shows that the slope of the flood line is very irregular and unruly, due, undoubtedly, to the extreme rapidity of the current in that stream, and to the unsettled condition in which the waters must find themselves, as they, at the lower end, have only been confined within levees since the last flood—that of 1893.

During the past high water a great deal of work was done in raising or capping the levees, which was not needed when the water was found to have reached its highest mark; but although it was impossible to predict to what height the river would reach, yet the experience of the past had demonstrated that excessive flood heights might be expected.

Although, in many instances, the water did not reach the mark to which it was thought it might go, and for which provision had been made in the work of raising, yet the expense thus incurred might be considered as very cheap insurance, for had the water reached a greater height, it would have met a line of levees prepared to stand it, and thus disaster would have been averted, which could not have been the case unless this preparation had been made. A great deal of this raising or capping, as it was called, was done in your district, probably not less than a hundred miles, and the water reached this capping, perhaps, only for a length of seven or eight miles. Yet the precaution was a wise one to take and one which can only be regretted in the light of an afterthought.

Many points of weakness in levees and in the system of maintenance were developed during the 1897 high water. Especially must we notice the extraordinary shrinking and settling that took place in the new levees built since 1893. Quite a number of miles of this new work was done, and, for four years, was not subject to high water. These levees settled in a dry condition and at no time became saturated. When the water came against them, they began settling at an exceedingly rapid rate. In some instances the settling amounting to as much as a foot and a half, thereby causing anxiety as to height in the levees, which heretofore had been considered exceedingly high.

Another point which was thoroughly demonstrated during this last water, was the great necessity for the thorough and effective drainage of the levees. It is safe to say, that wherever the levees were well drained, no trouble was experienced from sloughs, while, in every case where the drainage was neglected, the levees became wet and then soft, and, in many instances, sloughing was the result.

The system of draining the levees, as now existing, has proven most unsatisfactory, and some method or system should be devised, by which some authoritative head should be made responsible for the drainage of the levees, so that this most important matter would be attended to beyond peradventure. Too much stress cannot be laid upon this point.

Another point emphasized during the last water is the necessity of patrolling the levees during low water with small forces of men to repair wave-wash, rain-wash, road gaps, paths, gulleys and for the cutting down of shrubbery and weeds.

Road gaps and paths were frequently a source of anxiety, and had to be filled, in an unsatisfactory manner, with sacks, when a little bit of attention at low water would have rendered them absolutely harmless. In all instances where weeds and grasses were found on the levees in any quantity, the shade which they caused tended to maintain the dampness in the levees, thereby inducing softness and sloughing. It was found universally desirable to cut the grass and weeds, so as to allow the sun to exert its drying influence on the earth.

Another important point brought out by this water is the unadvisability of putting earth on the land side of the levee, if possible. Although, in a great many instances, especially on Bayou Lafourche, where the land side enlargement was made of dredged earth, this was found very satisfactory and dry, yet it must be recognized that most of the sloughs were to be found in places where there was land side enlargement or steep slopes. It would be unwise to make a general rule against this, as in many places the levees are so close to the bank that they cannot be enlarged on the river side, and to work on them necessitates land side work, or else the building of new levees entirely. But in such cases, the land side enlargement should be made very heavy and with flat slopes, or else, better still, it should take the form of a banquette or bench of earth, which accomplishes the required purpose without danger of slough. A rule, however, good to follow, is to avoid as much as possible placing the earth on the land side of the levees. In conclusion, it must be stated that although the high water fight in your district was an exceedingly anxious one, yet at no time was there any great element of danger, excepting at those places where the levees were known to be weak, and a strenuous effort was known to be necessary to maintain them. These places were the lower Lafourche, Hickey levee, which was of insufficient section, and the Raccourci, Old River and Ferguson levees, which were under contract before the water, but on which work had not yet been completed.

The question of grade to which the levees in your district should be built, is one which should receive serious attention. It has been said above that most of the levees were built to a grade three feet above the highest waters of the past, and that an effort was made to bring them to a height of five feet above the highest waters of the past; a great deal of this latter grade having been attained. A comparison of these intended grades with the high water of 1897 leads me, after deliberate consultation with the other members of the State Board of Engineers, to advise you to adopt a combination grade, composed of one five feet above the high water prior to 1897, and another three feet above the water of 1897, giving the preference to that of the two grades which will build the highest levee.

I will add, that after consultation with Capt. Derby, of the United States Engineers, this combination grade is also the one which he recomends, and will endeavor to have the Commission accept as to grade for the levees in your district.

The following table gives us a comparisou of the five-foot grade above the highest water prior to 1897, with that of the combination grade, and compares the two with the eventual high water plane of the Mississippi River, as estimated by the Committee on Levees of the Mississippi River Commission.

This eventual high water plane is the Commission's estimate of the highest water which they think we can have in the Mississippi River when it is all confined within levees, and it is interesting to compare our present and intended grades with their estimate.

APPROXIMATE HIGH WATER PLANE, AS REPORTED BY COMMITTEE ON LEVEES OF "MISSISSIPPI RIVER COMMISSION," AND OTHER COMPARATIVE DATA.

	Commission's Plane, C. D.	Grades of Levees 5 feet above highest water previous to 1897.	Combination Grade 5 ft. above 1892 and 3 ft. above 1897.	Margin of Combination Grade above Miss. River Commission H. W. Plane.
Red River Landing.	77.72	77.72	77.72	0.0 feet.
Bayou Sara.............	70.63	71.20	71.20	0.57 feet.
Baton Rouge..........	62.26	63.51	63.71	1.45 feet.
Plaquemine.............	58.26	59.86	60.31	2.05 feet.
Donaldsonville	53.08	55.34	55.54	2.46 feet.

An examination of the above table shows that our old five-foot grade is generally above the eventual high water plane outlined by the Commission, while the suggested combination grade improves this by amounts varying from zero to forty-five hundredths of a foot.

In view of the experience acquired during this high water fight, it is proper to make suggestions as to the work which should be done. Some of it should be undertaken immediately, and I consider it very advisable that your Board organize at once a system of small forces which should be put to work immediately repairing the damage done during the high water, that is, filling up wave-wash, road gaps, paths, cutting weeds, resodding unsodded levees, in fact, doing small repair work which should be done at once, and in the spring time, so as to permit the earth to solidify and become sodded before winter. It is exceedingly necessary that this should be attended to at once, and a system could be very readily inaugurated to have the work done by inspectors under the supervision of the local Commissioner.

The next work to undertake is the completion of the work which was interrupted by the advent of the high water. Some two miles of levees between Red River Landing and Barbre's should be completed, also some four (4) miles of enlargement in Raccourci, Old River, and some 3,000 feet of enlargement at McCullum.

The uncompleted work under the United States Government contracts, such as Raccourci, Ryan and other levees, will be at once completed by the United States Government, and we should also complete our work, so as to finish those weak and low stretches in Pointe Coupee which had been undertaken before the water. At the same time, I would suggest to your honorable body to prepare at once for extensive raising and enlarging in the lower part of your district between Baton Rouge and Donaldsonville. As I have said above, this has been exposed to a heavier fight than the upper part of your district, and there is every reason to believe that these conditions will maintain in the future. The United States Government will probably do an amount of work depending in extent upon the allotment made to your district by the Mississippi River Commission, and their funds should also be devoted to the lower end on your district. If it is then found that it is judicious to remove your efforts to the other portion of the district, it will then be time enough to do so—after you have made sure of the lower portion, then the next weakest portion can be attended to.

On Bayou Lafourche the work of enlargement has already been resumed under your dredge contract, and is progressing satisfactorily. There is every reason to believe that this method of treatment is going to prove satisfactory, and it may become advisable to avail yourself of this contract to treat a large number of levees between Thibodaux and Donaldsonville, which are in close proximity to the bank, and in need of enlargement. Besides, it must be borne in mind that after any excessive high water, excessive caving may be expected, and, therefore, it might be necessary to build large and expensive new levees, for which your honorable body should make provisions.

The construction of a new levee at Hickey by the State is progressing satisfactorily. The grade of this levee had been changed so as to make it three feet above the 1897 water, and, therefore, build it under the combination grade recommended above. It may be possible for the State to extend this work so as to cover the enlargement of the old levee between Hickey and St. Delphine, but it may also be possible that caving at Hickey should render necessary the extension of the new levee further up the stream.

In conclusion, I will state that I have touched upon only a few of the lessons taught us by the water of 1897, and by heeding the advice given us by the blind forces of nature, and devising the proper system to meet the emergencies which we know now can arise, we may hope in the future to withstand successfully even a much higher flood. At the same time, we should not underestimate the great achievement which has been accomplished in maintaining your line of levees unbroken during this past flood. Your honorable body should be congratulated upon this result, and also receive praise for the excellent work done by you during this very critical period.

Very respectfully submitted,
By Arsene Perrilliat,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., August 5, 1897.

To Col. T. G. Sparks, President of the
Atchafalaya Basin Levee District, Musson P. O., La.:

My Dear Colonel–Mr. Barrow, in one of his letters, tells me that it is your wish that we should do as much work as we can crowd in before the next high water, and put it under contract as soon as possible. I fully agree with you in this view, and as it was only a question of a few days before an understanding was completed with Capt. Derby as to the division of the work, I thought we might as well wait for that before advertising for more work. The Committee already had one interview with Capt. Derby, and they will hold a final consultation with him to-morrow. I cannot say that I am exactly pleased with the division of work that is proposed so far, but I hope they will alter it to-morrow. So far, the proposed division is for Capt. Derby to do all he can with his money above Baton Rouge, and for us to do the needed work below Baton Rouge. Now, in view of the fact that the last flood showed that the levees below Baton Rouge were much weaker and lower than the levees above Baton Rouge, I thought it advisable for us and the Government to join hands below Baton Rouge, and clear out that entire line, at the same time covering the points above Baton Rouge which showed decisive weakness, and when this was done to cover the entire line above Baton Rouge. By so doing we would have been sure to finish the first part of the programme before the next water, and if we did not complete the second part, then only our best levees would have been incompleted, the very ones we can best afford to make a stand on. The way it is now proposed, we will probably find ourselves next high water with some uncompleted work, both above and below Baton Rouge. We can make a pretty good fight above Baton Rouge, but we will find ourselves pretty hard pressed below. Again, we have an open cave on the Atchafalaya, at Merrick's, and this will require work there. On Bayou Lafourche we have three open holes, due to the crevasse and its accompanying caves, and we may have one or two more open holes. Besides this, there are many points in the neighborhood of Napoleonville which were clearly overtopped during the past high water, and which require raising and enlarging.

The dredge work on the bayou is getting along well enough, but they are not working it fast enough; that is mainly due to an inexperienced crew on new work, and will be overcome in time. At the same time, I do not see how they can earn more than about $30,000 this year, which ought to leave us with $30,000 more on our budget. This should be used to do the outside work on Bayou Lafourche, which I have mentioned above, closing open holes, and raising and enlarging urgent places about Napoleonville where the intensity of the flood was greatest.

If you think well of this suggestion, I think the next advertisement should be for the following work:

1st. Closing the open holes at Merrick's.

2d. Closing the open holes on Bayou Lafourche.

3d. Enlarging levees between Plaquemine and Medora.

4th. Enlarging levees in section 8 or 10, according to the decision of the Committee and Capt. Derby.

The third section of the advertisement being a stretch needing enlargement very much, and the fourth section being in accordance with our plan of doing much work on the Mississippi. All of this work to be let as soon as possible, after having gotten your authorization to advertise it.

Following this as soon as possible should be another advertisement for:

1st. More river work in sections 9 or 10, according to the decision of the Committee.

2d. Advertisement for raising and enlargement in Pointe Coupee and West Baton Rouge (this only to be based on the decision of the Committee).

3d. Raising and enlarging of levees on Bayou Lafourche, near Napoleonville.

If you think well of this project, please let me know it as soon as possible, for I must get my instructions from some one, and I have always looked to you for them, and no one else. Again, as soon as I hear from you I shall act, and the sooner the better.

* * * * * * *

Very sincerely yours,
ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 6, 1897.

To Col. T. G. Sparks, President of the
Atchafalaya Basin Levee District, Musson P. O., La.:

DEAR SIR—Mr. Wilkinson and Mr. Williams held to-day a consultation with Capt. Derby, and it was decided that the United States Government would undertake the work necessary to be done from Baton Rouge up, while the district would work on the levees between Baton Rouge and Donaldsonville. I cannot help thinking that this is not the wisest decision, and that it will result in our having a number of low levees in our stretch to meet the high water next year, should we have one. At any rate, we will do our utmost to cover the worst places between Baton Rouge and Donaldsonville this season. At the time, I told both Capt. Derby and Mr. Wilkinson that, in my opinion, this was not the best course to pursue. Capt. Derby thinks that, with the funds which he now has on hand, he can raise and enlarge everything now less than a four-foot grade up to the new grade, bringing this work down as far as Viola. He wishes us to enlarge a little piece of levee about 1,300 feet long, situated near Red River Landing, and which is far remote from any of his contracts, while it is close to some of ours. Mr. Wilkinson and I agreed that this was an advisable thing to do, and if you approve of it, I shall offer it to some of our contractors in the vicinity as additional work on their contracts.

I shall be prepared to issue an advertisement as soon as I hear from you in regard to what shall be advertised, as suggested in my letter of yesterday, or on any other plan. With regards, I am

Very truly yours,
ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 8, 1898.

To Col. T. G. Sparks, President, and the Members of the
Atchafalaya Basin Levee District, Port Allen, La.:

GENTLEMEN—I beg to inform you that in connection with the enlargement of the levee in front of the town of Thibodaux, it became necessary to remove and interfere with a large amount of private property, more so than is usually the case in the construction of levees in the rural districts. On that account I visited the locality frequently, in company with Messrs. Williams and Dugas, members of your honorable body, and found it necessary to make a number of changes in the location and dimensions of the levee, which, in our judgment, could be done to preserve private interest, and at the same time cause no detriment to the public interest. At the lower end of the town the land slope of the levee was somewhat curtailed in order to preserve a handsome brick sidewalk, built at great expense by the Catholic community of Thibodaux, and in order to preserve which the priest of the parish agreed to build a brick retaining wall against the earth of the levee so that the land slope might be curtailed, and at the same time the section decreased by a minimum. In crossing the property of Dr. Myers, in Thibodaux, it was found necessary to build a long sloped banquette, so as to deface his property as little as possible, while it would have been very much hurt had we carried out the usual section. By far the greatest hardship was imposed on the Southern Pacific Railway, which had to pull up all of its tracks existing in the front street of the town, abandon its turn-table, which was destroyed by the enlargement, pull down a warehouse and engine which it used on the batture, demolish its depot and remove it further back, and alter generally its curves and its grades. In order to reduce this destruction of property to a minimum, and in order to maintain roadways and traffic as much as possible on the town front, I altered this section in such a way as to elevate the roadway, between stations 8 and 18+20 of the enlargement, on which elevated roadway the railroad will put its tracks. There is, in my mind, no possible detriment to the levee by this action, and, on the contrary, I consider that in times of high water it will be valuable to have the tracks in close proximity to the levee for the distribution of material. I therefore beg to request that your honorable body ratify the action thus taken by me in connection with Messrs. Williams and Dugas.

Very respectfully submitted,
ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., February 10, 1898.

To Col. T. G. Sparks, President of the
Atchafalaya Basin Levee District, Musson P. O., La.:

DEAR SIR – I received your letter of the 6th inst., and as soon as Capt. Derby returns to the city I shall go up to see him, and talk over with him the matters which you mention, and then write to you on the subject. I wish to make you a detailed report on the situation at the Babin levee. You know that the people objected strenuously to allow-ing the contractor to get earth on the land side to complete the levee, (the only way that earth could be gotten). Mr. Williams, Mr. Dugas and I went on the ground repeatedly, interviewed the residents, promised, argued and plead, in some cases with success, and in others without success. We got the contractor to have recourse to law, and instructed him to put up his levee; we reduced the dimensions to a minimum in order to cut up as little as possible the properties of these people. In spite of all this, I found upon my visit to the ground yesterday, that no sooner were we gone, or no sooner had the constables departed, in some places the men would be interfered with. I also found that in two or three places the minimum dimensions which I had permitted had been further cut down, owing to some of the people interfering, and the impossibility of getting the required earth. I instructed the contractor to go on and strengthen these places. Acting upon these instructions, he again made an effort to get earth. I do not know with what success, but it is my opinion, as these people have placed so many obstacles already in his way, that they will oppose this last effort.

I send this letter in triplicate to you, to Mr. Williams, and to Mr. Barrow, and have written in a similar strain to Mr. W. H. Pierce at Thibodaux. I have done all that I could, and so has Mr. Williams. Therefore, I wish to make this detailed report to you in order that you might thoroughly understand the situation, should any disaster occur.

The levee that we have there may stand, and probably will, but in protecting the country from overflow, I consider that no chances whatsoever should be taken, and in this case there are certainly some chances against the levee, should we have a much higher water, and heavier rains The only remedy being to put more dirt on the levee.

I fear that I have written you at very great length, but I wish you to understand the situation very thoroughly. With regards, I am

Very truly yours,

ARSENE PERRILLIAT,

Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., April 11, 1898.

To Col. T. G. Sparks, President, and to the Members of the Atchafalaya Basin Levee Board, New Orleans, La.:

GENTLEMEN—On the occasion of your regular quarterly meeting, to be held on April 11, I desire to submit to you for your consideration the following report on the work done in your district since your last meeting in January, 1898.

Since that time the following levee contracts have been completed in your district:

BY THE DISTRICT.

Name.	Yardage.
Tanglewood	70,132
Ferguson	37,295
McCullum	64,548
Marioneaux	14,601
Medora to Reliance	46,227
Reliance to Turnerville	43,111
Plaquemine No. 2	18,409
Fortville	18,247
Tennessee	12,289
Rebecca	28,153
Olivia	46,309
Palo Alto and Dunboyne	58,653
Eimer, Harrell and Rice	72,912
Hanlon	68,623
Smoke Bend to Port Barrow	105,905
Merrick	35,076
Grand total	740,490

BY THE STATE.

Name.	Yardage.
Chenango	49,872

Moreover, since the date of your last meeting, the following levee work was undertaken by the Atchafalaya Basin Levee District:

NAME	APPROXIMATE YARDAGE.	APPROXIMATE YARDAGE PUT UP TO DATE.
Smithland	7,262	5,000
Marioneaux	14,601	*14,601
McManor to Smoke Bend	101,000	5,000
Morris Bayou	45,000	8,500
Totals	167,863	33,101

*Completed.

In addition to these works, the old contracts still uncompleted are as follows:

NAME	APPROXIMATE YARDAGE	APPROXIMATE YARDAGE PUT UP TO DATE.
Plaquemine	35,438	20,000
Fortville to St. Louis	68,627	35,000
Klotzville to Napoleonville	300,000	35,000
Babin	60,000	48,000
Lafourche Enlargement	1,250,000	210 000
Lucky Hit No. 2	107,917	90,000
Totals	1,821,982	438 000

The above tables will give you an idea of the work undertaken and yet to be done within your district.

Owing to an arrangement entered into between a committee of your honorable Board and Capt. Derby, United States Engineer, the bulk of the work done by your district on the Mississippi River during the last year has been located between Port Allen and Donaldsonville, it being agreed that the United States Government should expend its funds between Port Allen and Red River Landing, that is, in the upper portion of your district.

It is gratifying to me to report that you have done a large amount of work in your district during the past year, as evidenced by the reports which from time to time I have submitted to your honorable body. Recapitulating these, you have placed in position, since July of 1897, up to date, very nearly 1,450,000 cubic yards.

With regard to the contracts still uncompleted in your district, I beg to make the following remarks:

PLAQUEMINE CONTRACT.

This contract is unfinished in that portion known as the Loop. The levee at that point makes a U-shaped recession landward, which is some 1,773 feet long, and in front of which there is very little pit room. It was necessary for the contractor to very thoroughly drain the pit room in front of this loop in order to be able to procure some earth, and even then there was barely enough earth to do one-third of the required enlargement, which is very heavy. Moreover, the early freshet in January covered the little pit room, which had been drained, and prevented the use of it. The enlargement had then to be built from the earth carted up from the land side, and taken from a lump of earth material excavated by the United States Government from the proposed lock pit. This work is now in progress, and will be continued to its completion without interruption by the water.

MCMANOR TO SMOKE BEND CONTRACT.

This work is mainly enlargement, and is progressing well, but will very shortly be interrupted by the coming high water. At one point situated immediately above the McManor plantation, the old levee, though situated on a stable bank, which does not cave, and although being of fair size in section cannot be enlarged on the river side, owing to the fact that there is no pit room from which to obtain the material required. On that account I have laid out some pieces of new levees, which will contain considerable yardage, and which are situated far enough back to permit the procuring of sufficient material. It would be very desirable to find a method by which the existing levees could be enlarged, thereby saving the yardage now in them. The replacing of these levees by a new line would take about four times as much yardage as the amount required for their enlargement.

LUCKY HIT NO. 2.

Under this contract, which is situated on the Atchafalaya River, the Gaulden new levee has been built, and some 11,154 feet of old levee enlarged in the neighborhood of the Merrick and Collins places, on the Atchafalaya River. In addition to this, the Marine Bayou dike is being enlarged, and two short pieces of new levee have been built at Bayou Latanache, situated on the Atchafalaya River, about three miles above Melville. These two short pieces of new levee have been built as a temporary protection against possible caving at said dike. They cannot be expected to be efficient for more than this high water season, and it is absolutely necessary to undertake, as soon as the winter recedes, the construction of a new levee across Bayou Latanache. This will be a work of very great proportions, and one which will require great care and attention, owing to the size of the bayou to be diked and to the numerous logs which have sunk to the bottom of the bayou in the past. I would, therefore, recommend that your Board consider as soon as possible the letting out of a contract at that point for a new dike on a safe location.

MORRIS BAYOU CONTRACT.

This contract was entered into for the purpose of capping the levees situated between Lake Bayou and Melville, and also for the purpose of enlarging some 2,200 feet of levees situated near Morris Bayou, on the Atchafalaya, which were considered weak. The contractor has practically completed the said 2,200 feet of enlargement, but he seems to have abandoned the idea of capping the balance of that long stretch, as he has withdrawn the greater part of his forces, and has left on the ground only four scrapers, which have not yet begun the capping, and which force is clearly insufficient to do any effective work before the coming high water period.

BABIN CONTRACT.

This contract, situated on Bayou Lafourche, within a mile and a half of Lafourche Crossing, was let out last summer, prior to the yellow fever epidemic. On September 15 the contractor began work with three men; this force increased to eleven men on September 25, then during the yellow fever time, dwindled down to five men on November 5, and from thence was increased to twenty men on December 7, about the time at which the quarantines were raised. On December 22 we find a force of eighty-five men at work, and this increased to a force of 190 men on February 2. The work on this levee was finally interrupted on February 5 by the high water freshet coming into Bayou Lafourche. The contractor received frequent notices from the Board and from myself to increase his forces on this levee, and owing to this we find the increase between December 22 and February 5. At the time of the interruption of the work by the high water, the levees were not completed owing to the fact that the pit room was entirely covered by the high water. Numerous efforts were made by the contractor, some members of your Board, and myself, to obtain pit room on the land side, in order to build the levee to the required section. Although the members of your honorable Board agreed to the unprecedented condition of refilling the pits which would be cut on the land side with earth taken from the river side on the recession of the waters, yet the opposition of the land owners was so great that only a limited amount of earth could be obtained from the land side. In many cases the contractor and his men were threatened, and met with personal violence, while undertaking to take earth from the land side. The result of this was that on February 5 the work was interrupted with the levee still weak in two places. These occurrences were duly reported to me by your honorable Board from time to time. During the short decline which occurred between the last freshet and the present rise, the contractor worked with a force varying from eight to twenty-one men to strengthen the two weak places mentioned above. There was but a short time to do this, and only scant pit room, as the decline was not sufficient to uncover entirely the pits, only a portion of them emerging from the water. These two weak places have been made as strong as the rest of the levee; but should we have very high water on the bayou, a strenuous high water fight would have to be made on these levees, which were built of scant section, in order that a continuous line might have been completed before the last freshet; and I earnestly recommend that your honorable body take the matter under advisement for immediate consideration.

LAFOURCHE ENLARGEMENT CONTRACT.

Under this contract, which was undertaken to enlarge with earth taken from the bed of the bayou those levees which were too close to the bank of the bayou to allow pit room, up to date about 210,000 cubic yards have been placed in position. For a long while the machinery plant was in an experimental condition, and did not do efficient work. During the last five months, however, it has done excellent work, having an output running between 50,000 and 60,000 cubic yards per month. The entire front of the town of Thibodaux has been enlarged under this contract, and all of the low stretches between Lafourche Crossing and a point four miles above Raceland. On these stretches, although all of the earth has been placed in position, yet many of them are not yet shaped and sodded, as it takes considerable time before the material can dry sufficiently to be properly shaped. The amount of work thus done covers about five and one-half miles of enlargement, representing about 38,900 cubic yards to the mile. Had not this method been resorted to it would have become necessary to build entirely new levees, which would have averaged about 80,000 cubic yards to the mile. The district, by this method of work, saves a yardage of about 42,000 cubic yards per mile. The four miles yet to be done to bring the enlargement to Raceland contain only about two miles of weak and low levees, and construction notes for this are now being prepared.

Joined to this report you will find a communication from Mr. N. P. Phillips, contractor for the Ferguson levee, which he desires me to place before you for your consideration.

The work undertaken this year has been, on general lines, three feet above the high water of 1897, with a crown of eight feet, and slopes of three and three to one. Although a large amount of work has been done on the Mississippi River, there still remains, between Port Allen and Donaldsonville, a great deal of enlargement work to be done, from Port Allen to Medora, and from Bayou Goula to Pellico. For a great part of this surveys have already been made, and it is to be hoped that your honorable Board will find means to undertake this work as soon as possible.

There is quite a flood now coming down the Mississippi River, and which in the next two weeks will come against the levees of your district. The amount of water in sight at present is not sufficient to cause any anxiety on your Mississippi River front, although it may occasion a high water fight on the levees of lower Bayou Lafourche. Yet additional rainfall in the basins tributary to the Mississippi River might easily change this freshet into a dangerous flood-wave, and at this time of the year such a contingency is by no means improbable. The above embodies the report, which is very respectfully submitted by

ARSENE PERRILLIAT,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., March 21, 1897.

To Hon. M. R. Spelman, President of the
Pontchartrain Levee District, New Orleans, La.:

DEAR SIR—I returned Saturday evening from an inspection of the levee line in your district, from Carrollton to Gardere's. As Messrs. Gianelloni and Womack had carefully gone over the levees in East Baton Rouge the day previous, and were satisfied that nothing for the present was required to be done on East Baton Rouge levees, except cutting seepage ditches and cleaning out cross ditches for properly draining the base of these levees from seepage water, Mr. Gianelloni did not think it was necessary for me to go over these levees at this time, so I postponed the inspection to such date as would be convenient to Mr. Gianelloni.

Your levee line is in very good shape. There are many pathways made by foot and cattle travel across the levees, which should be filled in while the earth is available on the river side. Mr. Simon LeBlanc is having this work done on the levees in his parish, as well as all holes caused by uneven shrinkage, explored, tamped in and refilled. I have advised all the Commissioners to treat these holes likewise. I find a great many such holes on the top and slopes of levees raised in the last year or so, which are caused by unequal shrinkage of material and aggravated by recent rains.

I would advise that the proper authorities be required to drain the levees and roads. Seepage water is beginning to appear against the levees and should be drained off. The roads in the upper end of Ascension Parish, from Ashland up to the line, are almost impassable; and in one stretch the top of the levees is being used for the public highway. Rainwater was standing for nearly this whole stretch against the levees and over the public road for the want of proper drainage. You should see that this stretch of road is repaired, otherwise access to the levees by road, in time of danger, will be impossible, and the railroad is a long distance off from this neighborhood.

I have written a letter to every Commissioner, and send you a copy of same, advising what should be undertaken in the shape of minor repairs, before the crest of the wave reaches your levee line. It is likely that some crayfish holes will develop later on as the pressure of water increases, but nothing as compared to former troubles from this source. All hogs and stock, from this time on, should be kept off the levees.

If my services are needed at any time, I will be at all times ready and glad to accompany yourself or Commissioners to any threatened section of the district.

Yours respectfully,
SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., December 2, 1897.

To Hon. M. R. Spelman, President Board of Commissioners,
Pontchartrain Levee District, Convent, La.:

DEAR SIR—The report attached hereto, dated September 12, 1897, and now submitted as part of the present report, was prepared for your Board for a meeting which was to have been held at Convent, La., on September 14th, 1897, but which failed to take place, and the report, therefore, was not delivered at the time Since that date a further and more complete examination into the changes which have occurred in the condition of the levees of the district has been greatly retarded by the quarantine restrictions existing in the different parishes, in consequence of the visitation of yellow fever to this section of the State. But, though we have been unable to make as thorough an inspection as we would have wished of many points, we have, nevertheless, gained sufficient information to warrant changes of opinion in regard to the importance of certain works, and also to permit us to more closely estimate the amount of earthwork necessary at this time.

Knowledge of additional caving at Evergreen, which seriously threatened the existing levee line having reached us, measurements were at once made and a line for a new levee located to cover the threatened portions of the levee, and as it was not possible at the time for your Board to meet, and dispatch in placing the new work under contract was imperative, the following correspondence was at once had with you, viz:

"NEW ORLEANS, LA., October 9, 1897.

"At the last meeting of your Board the Evergreen (Margaret) levee, in the parish of Iberville, was reported as weak in section, but that on account of a recent cave at that point we would advise awaiting further developments before recommending that you undertake any enlargement of same.

"Since that date the caving has started afresh and has assumed such dimensions and approached so close to the base of the present levee as to make a new line of levee absolutely necessary this season, and in our judgment some steps should be taken at as early a date as possible to place same under contract, that work may be commenced immediately after quarantine is raised, or sooner, if it possibly can be arranged, should the same continue too late in the levee season.

"We have had a new line staked out covering the most threatened point and find it will require no less than 1,915 feet of levee, averaging about seventeen feet in height and approximating about 72,500 cubic yards of earthwork.

"As your Board on account of quarantine is temporarily tied up from acting on levee matters in their usual manner, and the season for important work is advancing, we thought you might consider it advisable that work on the upper Bonnet Carre levee in St. John parish had best be left to take its chances with other repair works in the district when your Board finds it possible to proceed, and that the State had better use its available balance of funds alloted to the district, in undertaking to place Margaret levee under contract at as early date as possible.

"Should this be agreeable to you, let me know by wire, and we will advertise at once.

"Yours most respectfully,
"H. BOL. THOMPSON,
"*Assistant State Engineer.*"

"Centre of levee to bank, September 10, 1897, 132 feet.

"Centre of levee to bank, October 6, 1897, ninety feet."

We received your replv to the above, reading:

"CHICAGO, ILL., October 12, 1897.

"Please deliver the following to Bolivar Thompson, Assistant State Engineer:

"Replying to yours of the 9th, relative to Margaret levee, Iberville parish, I agree with you to having State Engineers undertake the work and have so written to our Commissioners.

"M. R. SPELMAN."

Following this reply, the work was advertised by the State, and on November 3 awarded to Mr. I. R. Robbitt, at nineteen and five-eighths cents per cubic yard.

The contractor was delayed in commencing the work, but now promises to at once place a sufficient force upon it to insure its completion before high water.

The contractor for the district work at Hanson City has been, up to this time, somewhat slow, but has now a force employed upon his work which should complete all the work contemplated in his contract within the specified time.

The list of quantities required to raise and enlarge the stretches enumerated in our report of September 12, 1897, is herein respectfully corrected as follows:

IBERVILLE PARISH.

NAME OF LEVEE.	LENGTH IN FEET.	APPROX'TE CUBIC YARDS.	REMARKS.
Jolissant (A)	2,800	16,800	Might be undertaken by U.S. Government.
Magnolia to Oakley (B)	10,300	61,800	Estimated.
Oakley (A)	4,210	12,500	
Evergreen (B)	....	....	Covered by State, Margaret New Levee under contract by State.
Bagatelle (Dupuy) (B)	2,242	7,300	About level with 1897.
Arizona to Revenue (B)	7,678	24,000	About level with 1897.
Dreyfus (A)	2,697	5,200	About level with 1897.

ASCENSION PARISH.

NAME OF LEVEE.	LENGTH IN FEET.	APPROX'TE CUBIC YARDS.	REMARKS.
Southwood, Riverside and Waterloo (C)	8,500	50,000	Estimated.
Linwood and Belle Helene (C)	7,732	19,300	Levee low.
Landry (A)	3,660	16,000	Very low and weak in places.
Willow Grove (A)	1,365	15,000	Full grade & dimensions
Gem (A)	1,030	5,000	Very low and unsafe.
Leblanc (B)	1,512	3,500	Levee low.
Jamison (A)	4,661	8,000	Very low in places.
Hermitage and Bocage (C)	6,900	16.600	Low, and upper and lower portions weak.
Houmas (C)	6,700	40,000	Estimated.
Burnside to Parish Line (C)	9,800	20,300	Low.

ST. JAMES PARISH.			
Nita (A).....................	5,300	30,800	Low in places.
Belmont (B)..............	1,200	7,200	Low.
St. Elmo (A)..............	3,800	16,800	Under contract by U.S but maynot be ex'c'td
ST. JOHN PARISH.			
Louque (B).................	1,080	8,000	For full grade.
Up'r Bonnet Carre(A)	4,710	32,200	For full grade.
Lower Bonnet Carre (A)	....	....	Now under contract by the State.
ST. CHARLES PARISH.			
Hermitage, Good Hope, Sarpy (B)......	....	....	Short, low and wave-washed stretches, U. S. levee.
Sarpy Crevasse (C).....	....	....	Low in few places but not advisable to raise this season as levee is well sodded.
Frelsen (A)................	1,200	7,200	Low.
JEFFERSON PARISH.			
Hanson City (A)........	1,600	30,000	Under contract.

The river bank along the front of the Diamond plantation has cracked and settled down to a considerable extent, the distance between the line of disturbance and the base of the levee at one point being only twenty-two feet. Considerable anxiety is, therefore, felt by Mr. Godchaux and others in the vicinity in regard to the safety of the present line of levee there, and all are anxious to have a new line of levee, covering the threatened portion of the present levee, at once constructed.

A thorough examination of the conditions at the locality in question has been made, and, while it would, of course, be preferable to build a new levee to cover the entire stretch, say some 3,500 feet in length, it cannot be insisted upon, at this time, that the work is absolutely necessary.

While the unfortunate condition of affairs brought about by yellow fever and quarantines has undoubtedly greatly retarded levee work in the district, and the execution of much valuable work otherwise possible this season has been prevented, it may still be hoped that before the next high water a vast amount of improvement as compared with conditions prevailing during and immediately after the last high water will yet be accomplished.

In conclusion, the Board of State Engineers would respectfully again refer to the levee line at Baton Rouge, which was the cause of so much anxiety and contention during the last high water, and express the hope that an early and satisfactory understanding will be had between all parties concerned, to the end that the proper remedies may be applied to secure the district against danger from this point, which is specially important and conspicuous because of its location at the head of the district.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per H. Bol. Thompson,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., Sept. 12, 1897.

To the Honorable M. R. Spelman, President
Pontchartrain Levee Board, Convent, La.:

Sir—In compliance with your request, I have made as thorough an examination of your district, from Plaquemine Point to the lower line of Jefferson parish, as was possible under the circumstances, and the limited time at my disposal would permit, and have the honor to report as follows:

While this report covers stretches of levee in each of the parishes in the district, which are of great importance to the maintenance of the levee system, and points which should take precedence over other work, at the same time there are many points of minor importance, such as short detached stretches of wave-wash, cutting of drainage ditches, etc., which might be treated best through the local commissioners, or be attended to in connection with some of the contracts which your Board may make in their vicinity.

As it is expected that the work to be done by the United States Government, during the coming season, will complete the raising and enlarging of the levee line from the upper end of the district down to Plaquemine Point, or Jolisant levee, in Iberville parish, a distance of about twenty-four miles, this report only applies from that point down, and as it is, undoubtedly, beyond the means of the district at this time to undertake the continuous enlargement of all levees in the district to the full grade and dimensions adopted for Government work, I have only chosen points and stretches of levee of the greatest importance to the district at large, and where the levee was actually or nearly overtopped by the high water of 1897, and where the levee, on account of scant section, extraordinary wave-wash, or internal weakness, caused by crayfish or other burrowing animals, was apparently unsafe.

In estimating the quantity of earthwork required at each point I have only applied an amount which should be sufficient to bring it to a grade reasonably safe for the present, as compared with the better portions of the line, without attempting to improve the several stretches given to the full grade and dimensions of the work now undertaken by the General Government. This, I believe, is about the best you can expect to do this season with the limited means at the disposal of the State and your Board.

The localities in your district requiring special attention are as follows: Those classed A being of first importance; B, second importance, and C, third importance, viz.:

IBERVILLE PARISH.

NAME OF LEVEE.	LENGTH IN FEET.	APPROX'TE CUBIC YARDS.	REMARKS.
Jolisant (A)	2,800	16,800	Advertised for Sept. 13.
Magnolia to Oakley (B)	10,300	61,800	About level with 1897.
Oakley (A)	4,100	24,600	Advertised for Sept. 13.
Evergreen (B)	3,500	14,000	Weak section
Dupuy (B)	2,200	13,200	About level with 1897.
Arizona to Revenue (B)	5,600	33,000	About level with 1897.
Dreyfus (A)	2,700	16,200	About level with 1897.

ASCENSION PARISH.

Southwood, Riverside and Waterloo (C)	8,500	50,000	Levee low.
Linwood and Belle Helene (C)	6,600	40,000	Levee low
Landry (A)	4,300	34,000	Very low and weak.
Gem (A)	1,700	17,000	Very low and unsafe.
LeBlanc (B)	1,500	9,000	Levee low.
Jamison (A)	4,800	29,000	Very low in places.
Hermitage and Bocage	6,900	41,000	Low, and upper and lower portions weak
Houmas (C)	6,700	40,000	Low.
Burnside (C)	3,500	21,000	Low.

ST. JAMES PARISH.

Nita (A)	5,300	30,800	Low in places.
Belmont (B)	1 200	7,200	Low.
St. Elmo (A)	3,800	16,800	Under contract by U S.

ST. JOHN PARISH.

Louque (B)	1,080	8,000	For full grade.
Upper Bonnet Carre (A)	3,500	50,000	For full grade.
Lower Bonnet Carre (A)	....	....	Now under contract by the State.

ST. CHARLES PARISH.

Hermitage, Good Hope, Sarpy (B)	....	....	Short, low and wave-washed stretches, U. S. levee.
Sarpy Crevasse (C)....	....	....	Low in few places, but not advisable to raise this season as levee is well sodded.
Frelsen (A)	1,200	7,200	Low.

JEFFERSON PARISH.

Hanson City (A).......	1,600	40,000	Advertised for Sept. 13.

The Evergreen levee in Iberville parish is weak in cross-section and should be enlarged, but I would advise waiting awhile before undertaking it, to await the development of a recent cave which has taken place there.

The levee line at Jacob's, between Nita and Lilly levees, in St. James parish, is only 106 feet from the bank of the river at one point, but I can see no serious danger from caving at that point this season.

The cave which recently took place at Hester, in St. James parish, has only carried in the old levee, and there is still some distance between the river bank and the present line, which should be all sufficient for some time to come.

A cave has also recently occurred at Reserve, in St. John parish, but there is still a distance of 180 feet between the cave and the centre of the levee, and I can see no necessity of undertaking the construction of a new levee there this season. Mr. Godchaux is now doing some exemplary work there in filling the old pits and in strengthening the base of the levee.

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per H. Bol. Thompson,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., January 14, 1898.

To the Honorable Board of Commissioners
for the Pontchartrain Levee District:

Gentlemen—A letter of December 27th, from the President of your Board, requested the Board of State Engineers to make an investigation and to report to you as to the safety of the proposed line of levee construction in the city of Baton Rouge, commencing at the upper end of your district and running above the railroad depot. It also stated your desire to take the matter up at your next meeting, and that if you were "not satisfied that the proposed construction will give the district complete protection, you will discuss the advisability of building a protection levee from your levee to the foot of the hills."

We accordingly addressed the Mayor of Baton Rouge, enclosing a copy of the President's letter, and requesting that this Board be supplied with the information requisite for an intelligent report upon the character of the work proposed. and suggesting a conference with the City Engineer, or committee in charge of the work, for mutual understanding of the situation. On Monday last, January 10, through the courtesy of the Streets and Landings Committee, and of Mr. Swart, the City Engineer, we were shown over the proposed line and furnished with full information, including map, profile, specifications, etc., and now have the honor to report as follows:

The line of levee proposed extends from North street to South Boulevard, where it connects with the levee of the Pontchartrain Levee District, a length of nearly one mile, including 280 feet of "mud-box," or coffer dam construction, in front of the saw-mill. From North street to near Convention street, a distance of about 1,600 feet, the line is to be the same as now occupied by the railroad track, which latter is to be moved ten feet inland. The crown of the levee is to be to one foot and four tenths (1.4) above the level of the highest known water, and six feet wide. Side slopes of embankment to be two to one on river side, and one and a half to one on land side. According to profile, the general height of this part of the levee above the level of the street will be from three to five feet. From near Convention street to a point about a hundred feet above the Burton Lumber Company's saw-mill, a distance of about 2,450 feet, the proposed line is practically the same as that occupied by the existing levee, except that a "run around"—including 130 feet of "mud-box"—is to be carried around the saw-mill of Moorman's oar factory. The crown of levee is to be six feet wide, and, as shown by profile, is to be three and four-tenths (3.4) above the highest water. The existing levee is to be enlarged on the river side, so as to have a side slope of two to one; the land side slope to be one and a half to one From this point (about one hundred feet above the Burton saw-mill) the proposed new line makes a detour towards the river bank, surrounding three sides of the saw-mill, and about 440 in length, inclusive of 150 feet of "mud-box" in front of saw-mill, and thence runs through the Burton Lumber Company's yard, some 150 feet on the inner or land side of the existing levee, a distance of about six hundred and seventy-five feet (675 ft.) to a junction with the levee of the Pontchartrain District, at or near the South Boulevard. This part of the line, from point above saw-mill to the Pontchartrain District levee—except the "mud-box" in front of saw-mill—is to have crown six feet wide and side slopes two to one The profile shows its grade at three and four-tenths feet above highest known water, and the specifications describe it as "about twelve and a half feet high" or "about one foot higher than the old grade of the Pontchartrain levee."

There are numerous sewer pipes, wooden drainage boxes, old revetments and other structures to be removed (though two iron pipes are to be left under the levee) and a large quantity of saw-dust, slabs, etc.—described in specifications as amounting to about 8,000 cubic yards—is to be dug up and removed from the yard of the Burton Lumber Company.

The earth required for the construction of the proposed levee is estimated at about 50,000 cubic yards, and the specifications state that,as there is not enough material close at hand, "the contractor can get earth from the railroad company or elsewhere."

The slope of the new work on a considerable part of the line will fall well down upon the low and narrow batture, and until grass has time to grow, will be necessarily much exposed to wave-wash, as no provision appears to have been made for revetment or other protection.

We are informed that the probable cost of the entire work, as proposed, has been estimated at as much as $30,000.00, and that one-half the cost will be paid by the railroad company; and also that the company has been solicited to advance the other half to be refunded by the city from future revenues.

Sealed proposals for the work were invited by the Streets and Landings Committee on December 8, to be opened on the 20th; but the date for opening was postponed until January 10, and on the latter date was again postponed for a few days, awaiting some definite arrangement for securing cash funds for the city's moiety of cost.

Meanwhile, of course, no work has been begun on the proposed new levee, and the condition of the existing line remains practically unchanged since the subsidence of last season's high water, except that the so-called "mud-box" built at that time to cover the crevasse in the line—actual and threatened—has been torn down and removed.

Considering all the facts of the situation as above described, we conclude, with regret, that we cannot give you the assurance asked for: "that the proposed construction will give the district complete protection." If the proposed levee were already actually built, or even in an advanced stage of construction, you might, perhaps, feel reasonably secure in trusting to it for the present protection of the Pontchartrain District, and hope it would be ultimately improved to compare in strength with the levees now being built in your territory. But we should not lose sight of the fact that such a levee as is designed for the Baton Rouge front would never be satisfactory to the people of the Pontchartrain District, if proposed for or built as a part of their own levee system. Neither its grade nor width of base, its location nor the perishable "mud-boxes" proposed, would be trusted or tolerated by them as a part of the levee system of the district.

Should you conclude to again consider the project, frequently suggested and discussed ever since the organization of your district, of building a protection levee across the head of the district, from the

Mississippi River to the foot of the hills,—as intimated in the President's letter asking for this report,—it would be well to appoint a committee to examine the ground, and to determine the location and other details. If such a levee were constructed as near the upper limit of the district as practicable, with a gap left open for drainage, and another for the railroad track, it could not damage anyone, unless it were the owners of the land actually occupied, and in case of accident to the levee, either above or below, the gaps could probably be so promptly filled as to give protection, otherwise impossible, to the property on the other side of the cross-levee. Any line of cross-levee that would be likely to be located anywhere within a half-mile of the upper end of the district, could probably be built to a standard grade and dimensions, with not exceeding 50,000 cubic yards of earthwork.

But an instrumental survey would, of course, be necessary to determine the details of location and the amount of work required, and we shall be ready to accompany a committee of your Board, or to make such surveys as you may desire at any time, and upon short notice.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per Henry B. Richardson,
Chief State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., July 21, 1896.

To the Honorable Board of Levee Commissioners,
for the Lafourche Basin Levee District:

Gentlemen—In my remarks at your meeting of July 8, I alluded to the unfavorable influence which I apprehended might result from lack of full co-operation on our part in the work of levee improvement now, and for some years past, in such gratifying progress by the local levee districts, the States and the United States.

The discussion of this subject at that time led me, shortly after, to address Major B. M. Harrod, member of the United States Mississippi River Commission, relative thereto, and I now beg to lay before you the accompanying copies of my letter to him and of his reply, and to respectfully suggest that you give the subject further consideration.

In my judgment, you will find it necessary, at an early date, in order to keep pace with the improvements which I believe will be undertaken by other levee districts, to still further raise and enlarge your system of levees on the Mississippi River. Probably a margin above the high water line thus far recorded of, say three and a half feet at the lower end of the district, and five feet or more at the upper end, will not be considered excessive as a proper grade line in the near future. To raise and enlarge your present line of levees to such a standard, I have roughly estimated would require between two and three million cubic yards of earthwork. I presume there can be no question that the early application of two to three hundred thousand dollars worth of work to the improvement of this line of levee will greatly increase its efficiency.

Of the total amount of earthwork done upon the levees of the district since its organization, about fifty per cent. has been done by the Board, about forty per cent. by the United States, and about ten per cent. by the State.

If similar co-operation can be continued, it must certainly tend to the security and welfare of the district.

Very respectfully,
HENRY B. RICHARDSON,
Chief State Engineer.

Two enclosures:

(A) Copy of letter from Chief State Engineer to Major B. M. Harrod, member of Mississippi River Commission, and

(B) Copy of Major Harrod's reply.

" STATE OF LOUISIANA,
" OFFICE BOARD OF STATE ENGINEERS,
" NEW ORLEANS, LA., July 10, 1896.

" *Major B. M. Harrod, Member U. S. Mississippi River Commission,*
" *Masonic Building, New Orleans, La.:*

" DEAR SIR—At a recent meeting of one of our District Levee Boards I stated my opinion, or rather my impression, that any failure by our local Levee Boards to exercise all the powers vested in them for raising revenue, or in the application of such revenues to the continued improvement of their levees, would probably be taken note of by the River Commission in considering future allotments of funds for levee work, and could hardly fail to be prejudicial to the interests of the Levee Boards so failing, if not to all levee interests in the State and elsewhere.

" This impression, originally derived from my knowledge of the stress laid by the Mississippi River Commission upon the importance of the co-operative feature of the work of levee improvement, was strengthened by the character of the questions asked me by members of your Commission at your late meeting in New York, as to the operations of our local Levee Boards, and, I may add, by reading a recent interview with you in the New Orleans *Picayune* of June 30.

" As the Levee Board in question has not yet levied its district taxes for the current year, and as a number of our other Boards are in like situation, I shall be greatly obliged to you if, as a member of the Mississippi River Commission, you will write me your views on the subject above referred to, with permission to lay your letter before our local Levee Boards.

"I am sure they would not fail to properly appreciate the information they should derive from such a letter, and I believe it might prove of great public service.

"Very respectfully,
"HENRY B. RICHARDSON,
"*Chief State Engineer.*"

"OFFICE OF B. M. HARROD,
"CIVIL ENGINEER,
"NEW ORLEANS, LA., July 10, 1896.

"*Major H. B. Richardson, Chief State Engineer, New Orleans, La.:*

"DEAR SIR—I am in receipt of your letter of July 10.

"Those who have been connected with the advancement of the levee system of the Mississippi River since 1882, know that it has been based upon the co-operation of the State organization and of the United States. It is repeatedly represented in the reports of the State and other local authorities that after the flood of that year, the condition of wreck and discouragement was such that, without the assistance which the General Government then first extended, the reclamation of the valley by a general levee system would have been indefinitely abandoned. On the other hand, it is equally well established that the assistance of the United States was first rendered as auxiliary to State work, as at Bonnet Carre and other localities

"This attitude of the General Government assumed by its agents, the Mississippi River Commission, was defined and defended during certain congressional investigations of the transactions of the Commission. The position then assumed by the Commission, of a full co-operation in this work as of advantage to both local and General Government, has been maintained since without further question.

"While the engineering features of this great work have not allowed the allotments of Government appropriations to be proportioned directly to the extent of the co-operation of the riparian States, yet this, in the deliberations of the Commission, has always been distinctly recognized as a motive in its conclusions.

"For myself I desire to say that I think the share of work assumed by the Commission has been liberal, up to the limit contemplated in the legislation under which it acts, and of the interest which the General Government has in the work.

"I concur in your statement as contained in your letter 'that any failure by our local Levee Board to exercise all the powers vested in them for raising revenue, or in the application of such revenues to the continued improvements of their levees would probably be taken note of by the River Commission in considering future allotments of funds for levee work, and could hardly fail to be prejudicial to the levee interests in the State and elsewhere.'

"The General Government has not assumed exclusive charge of the levees. The joint interest of the States and of the United States in the work is recognized, and, while this is so, the effort of either party should not fail to act as an incentive to the other.

"Very respectfully,

"B. M. HARROD."

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 7, 1897.

Mr. L. D. Martin, Secretary Lafourche Basin Levee District:

DEAR SIR—The yardage placed upon the levees in your district under the Hart & White contract, which I presume is practically all the levee work undertaken by the district between August 15, 1895, and August 15, 1896, is about as follows:

New levees	469,492 cubic yards
Raising and enlargement	194,293 cubic yards

There stands to-day about forty miles of levee, two and one-half feet above high water of 1893. To raise and enlarge levees on Bayou Lafourche with a grade two and one-half feet above high water mark of 1893, crown six feet and slopes three and three to one, you can estimate safely that it will take six cubic yards per running foot; to build and renew same eighteen cubic yards per running foot.

Yours truly,

SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 18, 1897.

*To the Honorable Board of Levee Commissioners
for the Lafourche Basin Levee District:*

GENTLEMEN—At the request of your attorney, we beg to submit the following facts as to the alluvial formation of Grande Terre and Grand Island islands.

In Humphreys and Abbott's Report on the Mississippi River, page 472, with regard to the formation of the delta, we read:

"The point of ancient land that now terminates New Iberia, on the Teche, doubtless extends much farther towards the southeast, though now covered with alluvion. If the shore line of the present Mississippi Sound be prolonged it will pass near Berwick's Bay, and it is probable that on this line there existed a chain of sand islands, or cordon littoral, forming the southern shore of the ancient sound. Nearly parallel to this line is the chain formed now by the sand islands, called the Chandeleur, Breton, Timbalier, Last Island," etc., etc.

These islands between the mouth of Bayou Lafourche and the Mississippi River, reasoning by analogy to be covered by alluvion, must have, at one time, been subject to overflow from the Mississippi River, the extent of such overflow depending on the height of flood line in the river, and the amount of water escaping through Bayou Lafourche, the main tributary, as well as the west bank of the Mississippi River, across the country into the Lafourche Basin, where these islands are situated. All maps that indicate any distinction as to classification of lands, show these islands to be in the alluvial valley of the Mississippi River, and subject to overflow. Since the leveeing of the Mississippi River and its tributaries these overflows have been very materially reduced. It is a known fact that the Davis crevasse water, 1884, was appreciably felt on these islands.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 19, 1897.

Hon. Victor Maurin, President Lafourche
Basin Levee District, Donaldsonville, La.:

DEAR SIR—We have estimated, irrespective of State contracts and contemplated extensions of same, the following yardage, as per adopted grade of work necessary to be done on Bayou Lafourche:

ASCENSION PARISH, SECTION No. 1.

Raising and enlargement	50,000 cubic yards

ASSUMPTION PARISH, SECTION No. 2.

New levees	75,000 cubic yards
Raising and enlargement	125,000 cubic yards

SECTION No. 3.

New levees	70,000 cubic yards
Raising and enlargement	150,000 cubic yards

SECTION No. 4.

New levees	225,000 cubic yards
Raising and enlargement	100,000 cubic yards

LAFOURCHE PARISH, SECTION No. 5.

New levees	150,000 cubic yards
Raising and enlargement	100,000 cubic yards

SECTION No. 6.

Raising and enlargement	150,000 cubic yards

SECTION No. 7.

New levees	175,000 cubic yards
Raising and enlargement	90,000 cubic yards

SECTION No. 8.

New levees	75,000 cubic yards
Raising and enlargement	50,000 cubic yards

SECTION No. 9.

New levees	200,000 cubic yards
Raising and enlargement	100,000 cubic yards
Lafourche parish, below Harang's Canal, seven miles, estimated at 30,000 cubic yards per mile	250,000 cubic yards

RECAPITULATION.

Ascension Parish, Section No. 1	50,000 cubic yards
Assumption parish, Sections Nos. 2, 3 and 4	745,000 cubic yards
Lafourche parish, Sections Nos. 5, 6, 7, 8 and 9	1,135,000 cubic yards
Lafourche parish, below Harang's Canal	250,000 cubic yards
Total	2,135,000 cubic yards

Yours truly,
SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., August 19, 1897.

To the Honorable President and Members of the
Lafourche Basin Levee Board:

Gentlemen—After a thorough examination of the present condition of the Davis levee, in St. Charles parish, we are of the opinion that the existing levee should be enlarged and maintained in preference to the construction of a new levee on any line nearer the river bank. We base our conclusions upon the fact that this levee was built after the crevasse of 1884 upon a solid foundation, and of the very best material, which could not be the case if substituted to-day by any line for a new levee out on the front, for there would be logs, rack heaps and trash more or less under the base, and the material available for its construction would be the deposit which has taken place since the high water of 1884

We are aware that beginning in the fall of 1884 and lasting to the spring of 1885, and subsequently in the spring of 1886, there was a movement of the mass of earth in the levee, or a sloughing towards the river side across the lower channel of the crevasse, and in consequence, after the completion of the main levee, we were compelled, at those periods, to keep a small wheeling force at work until the same had come to its bearings.

The trouble to-day is in the same section of this levee, and is caused, in our opinion, by the movement of this mass of earth, due to the want of cohesion between the fresh earth added to the old embankment just previous to the last high water, greatly aided by the unequal distribution of weight caused by the filling in a mud-box on river slope of said levee during high water.

We believe, and we recommend, that the proper treatment of this section of the embankment where the sloughing now exists, is, first, to remove all woodwork of existing mud-box, and to distribute the dirt of same, adding more if necessary, for a proper cross-section, and that the willow growth in front for 100 feet be slashed, and if it should become necessary, a berme or banquette be added across depression on river side.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., September 7, 1897.

To the President and Commissioners of the
Lafourche Basin Levee District:

DEAR SIRS—At your request, as expressed by resolution of your honorable body of the 20th of August, 1897, I have staked out as delineated on enclosed plan a line for a new levee on the front, substituting the present levee, known as Davis Crevasse Levee, built in the years 1884 and 1885. I also enclose the notes and specifications for the construction of this levee, all of which is subject to your approval and final disposition. The yardage for new levee amounts to approximately as follows:

In main dump	65,000 cubic yards
In thirty-foot banquette	15,000 cubic yards
In search ditch	5,000 cubic yards
Total	85,000 cubic yards

Very respectfully,
SIDNEY F. LEWIS,
State Engineer in Charge.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., December 14, 1897.

To the Honorable President and Members of the
Lafourche Basin Levee District:

GENTLEMEN—The following table will explain the present status of all outstanding State and District contracts in your Districts:

BY THE DISTRICT.

NAME OF CONTRACT.	CUBIC YARDS IN CONTRACT.	CUBIC YARDS IN POSITION.
MISSISSIPPI RIVER AND BAYOU LAFOURCHE.		
Section 2, Lafourche.		
Kock	60,021	60,021
Vives Dugas	89,883	89,883
Section 3, Lafourche.		
Guion to Madewood	126,226	70,000
Section 5, Lafourche.		
Jeffries Foundry	41,557	41,557
Section 7, Lafourche.		
Knoblock to Folse	17.540	17,540
Knoblock to Folse, Extension	2,593	2,593
Waguespack Store	24,380	24,380
Theriot, New	18,787	18,787
Theriot, Enlargement	7,721	7,721
Theriot-Lepine	54,625	54 625
Lepine to Upper Ten	41,275	41,275
Lepine to Upper Ten, Enlargement	4,166	4,166
Section 9, Lafourche.		
LeBlanc Crevasse	45,506	10,000
Gandron Savoie Crevasse	17,500	8 000
Section 11, Mississippi River.		
Davis	85,938	85,938
Total	637,718	536,486
Railroad bridge to wharf	43,623	24,000
Wharf to Peytavin	18,025	18,025
Sims to Peytavin	23,407	5.300
Perret	7,598	7,598
Company Canal to Westwego	10,844	8,300
Morgan's Wharf to Harvey Canal	86.500	43,500
Parish line to Morgan's Wharf	78,576	68,400
Star	3,296	3 296
Myrtle Grove	6,501	6,501
Total District work	916,088	721,406

BY THE STATE.

Nolan	96,030	70,000
Crescent	69,852	69,852
Pike's Peak	146,720	90,000
Total	312,602	229,852
Grand totals	1,228,690	951,258

Whilst the late quarantine restrictions did set back, to some extent, the levee work undertaken in your district, still it is gratifying to know that at no time was this work entirely interrupted.

Notes have been furnished under the Hart & White contract, in accordance with resolutions of your Board at stated periods, amounting to 637,718 cubic yards, of which amount said contractors have completed up to date, approximately 536,486 cubic yards.

There has been some caving of river bank, notably at Cofield's, Buena Vista, Star, Ashton and lower end of Coopersville, but up to date there is no breach in your levee line from this source.

The Davis new levee, and the levees in lower end of Jefferson parish and around Donaldsonville, should be revetted.

Very respectfully,
SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 17, 1898.

To the Honorable President and Members of the
Lafourche Basin Levee District:

GENTLEMEN—I would respectfully call your attention to the following facts with regard to certain levees under contract and now nearing completion in your district:

In the Railroad to Wharf contract at Donaldsonville, neither the pump house nor supply pipe through the levee have been removed, and a water main has been laid and covered up under the base of the levee just below the steamboat landing. However, the town of Donaldsonville is exempted from the provisious of Act No. 62, Session of 1892.

In the Company Canal to Westwego levee there is a six-inch supply pipe through the levee which has been covered up by the contractor, also a small distributing pipe.

In the Company Canal to Southside store contract there are two eight-inch water pipes through the levee, leading to the Ames sugar-house, which have been covered up by the contractor.

In the Company Canal to Westwego levee there are two gaps left open for the convenience of the Texas & Pacific Railroad authorities.

In the work from Harvey's Canal to lower end of the parish, there are gaps innumerable, in front of the oil mills and ware-houses, for the convenience of commerce, and also four railroad gaps, one of which is for the convenience of the Southern Pacific Railroad authorities and three for the convenience of the Texas & Pacific Railroad authorities.

There are also gaps left for log-ways for the benefit of the stave companies.

As these contracts will be completed in a week or so, it becomes necessary that some recognition of these facts be taken by your honorable Board so that a final settlement can be made with your contractors.

Very respectfully,

SIDNEY F. LEWIS,

Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., May 4, 1898.

Hon. Otto Thoman, President Orleans Levee Board, City:

DEAR SIR—Having been directed by the Governor, in compliance with the request of your Board, "to confer with you as soon as possible without injury to the service elsewhere," I have, as directed by you, made a careful inspection of the levees of the Orleans Levee District along the Mississippi River, left bank, including the "Upper Protection Levee," and now respectfully submit the following relative to my observations and conclusions:

The Upper Protection Levee was designed to prevent overflow of the city in case of crevasses in the levees of Jefferson parish, but has never had water against it. The extensive work of enlargement, now nearly completed, has been prosecuted with great dispatch and appears to have been done in a careful and workmanlike manner. The plank revetment on the upper face of this levee should serve to prevent the washing away of its steep face by the current in case of a break near by in the front levee, though it can hardly take the place of a flatter slope and wider base, which it should have to make it entirely secure; and, as it cannot be foreseen with certainty to what height waters would come against the protection levee should a break occur in Jefferson, the degree of protection it would afford remains an unknown quantity.

It is, therefore, a fortunate thing for the Orleans Levee District that the levees in Jefferson parish from the city limits to Kenner have been greatly strengthened during the past few years, and, as reported by the officials in charge, are in good condition. In my judgment the safety of the city of New Orleans from overflow still lies as much in the integrity of the Jefferson levees below Kenner, as in the protection levee itself. But though its exact value remains untested, the protection levee undoubtedly gives the city double protection against overflow from above, and is, therefore, a work of prime importance. Water from a crevasse in Jefferson parish, or elsewhere in the Pontchartrain Levee District above Kenner, would hardly reach the Orleans Levee District, unless, perhaps, in the rear of Metairie Ridge.

The ordinary earthen levees, which extend from the Jefferson line to the Stuyvesant docks, and from the Jackson saw-mill to the Slaughter-house, are generally of about the same grades and sections as those in most of the rural levee districts of the State. Some of them already had a margin of two to two and a half feet above the present stage of water in the river, and all of them that required it have been or are now being raised or "capped" to a height intended to be sufficient for a stage at least one foot higher. Wherever leaks or soft and spongy places have appeared much work has been done, either on the land side base in the way of drainage or of reinforcement, or else on the river side by filling earth into the water to give additional width and stop seepage. Nearly all this work appears to have been attended with marked benefit to the condition of the embankments, and the whole of these lines of levee now appears remarkably free from seepage water and from the soft and sloughing places usually so frequent along the levees during very high water. It is probable that quite a number of the soft spots which have shown a tendency to slough, have been caused, or at least intensified, by the trampling and probing of the numerous visitors who at one time were allowed to make daily excursions over the line.

In this connection, it may be proper to call attention to the fact, seemingly overlooked by many, that all ordinary levees are necessarily saturated, and to some extent soft, where the water stands against them, and that under such conditions a large quantity of seepage water always filters through or under them.

Taken altogether, the ordinary earthen levees of the Orleans District on the left bank are, in my judgment, fully as good and sound as similar works in other levee districts.

The so-called "box levees," most of which are in the lower part of the city, have all been well braced at frequent intervals, and appear sound and unusally free from leaks. The Biennial Report of the Board of State Engineers, of April 20, 1894, in referring to these "box levees" has the following: "As these structures are largely of perishable material, and their location such as to render frequent renewal necessary, as the erosion of the banks progresses, they must be considered a temporary expedient which cannot long continue to prove satisfactory." They have continued, however, from that time to the present, and, indeed, have been considerably extended. Like the earth levees, they have required some raising this season; but their present appearance gives no indication of weakness.

The complex structures existing at several points, mostly about the yards and sheds of some of the railways, do not appear quite so thoroughly secured as other parts of the line, but in nearly all such cases the height of water against the works is very little, while the vigilance, ample means and organized forces of the railroad officials are believed sufficient to insure safety. A notable exception in the general condition of the railway properties is presented by the Stuyvesant docks, where the front has been so graded up for the full width of the property that no levee, in the ordinary sense, is needed.

The long lines of levees along what is known as the "Commercial

Front" are built up of sacks, generally backed with earth, and are being constantly enlarged and strengthened. It is to be expected that as the water rises higher against them, there may be considerable leakage through or under the sacks, but the height of water against them must be so slight that with the large forces and abundant material available, and the constant watchfulness maintained, there can be no danger of serious accident to or from them.

While going over your line I have been in almost continual conference with City Engineer Bell, and have scarcely found any suggestion to make which had not been already anticipated; and I have no recommendations to make at this time except that you continue the work you have in hand as rapidly as possible and while the good weather lasts.

The result of my inspection has been altogether reassuring; you appear to have competent and careful men in charge of the several sections of the work. The City Engineer (who is in executive charge of the whole line, as I understand it), appears to me to have ordered and supervised the work with skill and good judgment, and he has the assistance and co-operation of the experienced advisers employed by the Citizens' Committee. I can see no reason why you should not expect to have the whole line prepared for a stage of at least twenty feet on the Canal street gauge, which, I believe, is not improbable, and a considerably higher stage, if it should come; nor why you should not look forward with confidence to holding such a stage through fair weather and foul, if necessary, for weeks to come. Doubtless much further care, labor and expense may be called for to do this; but if you keep on with the spirit and determination now apparent, and with the support and assistance of our good citizens, which should be accorded, I believe you will succeed.

There is surely no justification for popular alarm in the present situation. Its lesson, however, should not be forgotten in the future; it is that New Orleans is too populous, too rich, and, I hope, too progressive a city to be left longer with levees that the most conservative, or even the most timid, can look upon as insecure. While it is true that every man who lives or owns property behind levees takes a certain kind and degree of risk upon himself not incurred by the dwellers in the hills, and that the greater part of alluvial Lousiana must probably always remain under some such risk, it is equally true that the risk can be reduced to almost any extent by making the levees wider and higher, and that it is only a matter of labor and cost to build levees around the city of New Orleans that will remain impregnable against any flood.

Respectfully submitted,

HENRY B. RICHARDSON,

Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 18, 1897.

John Dymond, Esq , President Lake Borgne Levee Board:

DEAR SIR—Yours of the 15th inst. just received. From the best information and data at hand, it will take upwards of 1,250 000 cubic yards of earth to build and enlarge the levees in the Lake Borgne Levee District to a grade three (3) feet above the high water of 1897, with crown eight feet and slopes three and three to one.

Yours truly,
SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., November 29, 1897.

To the Honorable President and Commissioners
of the Lake Borgne Levee District:

GENTLEMEN – In accordance with resolutions of your honorable Board of the 19th inst., we have made a reconnaissance of existing line from Bohemia, lower line, to Mistress W. E. Williams' estate, some two and one-half miles further down. The first half mile of this stretch of levee, from lower line of Bohemia to lower line of Charles Fox, could be placed in very good shape if the existing rotten flumes be removed, and the levees cleaned, cleared and repaired. From the lower line of Charles Fox to Mistress Pinaud, some 8,000 feet of new levee, and from Waltzers to estate of Mrs. Williams, some 2,000 feet more will be required to close the many crevasses and supplement the fragmentary stretches of existing levee too near river bank to be repaired and enlarged for any degree of permanency.

It is approximately estimated, on the basis of a seven-foot levee, six-foot crown and side slopes of three on one, that it will require upwards of 75,000 cubic yards of earth to build good substantial and standard levees for a distance of two miles, and on a line sufficiently far back for any degree of permanency.

A levee of similar dimensions, say five feet high, four feet crown, and two on one slopes, will take upwards of 35,000 cubic yards of earth, and located on the same line. Whilst a levee of such dimensions might serve its purpose, we do not recommend it.

An estimate of yardage for a protection levee on Bohemia lower line would depend on the length of such a line of levee. There is to-day an existing side levee of upwards of 1,800 feet in length which would have to be extended towards the river some 400 feet, and towards the rear at least a mile or more to give protection to the lower end of the district. We believe such protection would be local at the best, for we see no good reason why the water would not back up through the bayous and natural outlets for drainage purposes, unless the same be diked, and thereby partially destroy the drainage of area to be protected. For this reason alone, outside of the cost of such a levee, if the law permits you to do so, we believe it would be far preferable to build a protection levee on the front for two miles below lower line of the district, than to attempt to protect the lower end of the district from back water, by a side levee on lower line of Bohemia.

Yours respectfully,
THE BOARD OF STATE ENGINEERS,
Per SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 5, 1898.

Hon. John Dymond, President Lake Borgne Levee Board, Belair, La.:

DEAR SIR—As per resolution of your Board, December 17, 1897, I have issued the notes for the construction of the Bohemia to Nestor Canal levees. The total yardage in embankment, muck ditch, and cross-ditches, amounts to upwards of 31,000 cubic yards. The calculations are based upon levee work to cover this stretch, at a grade of one-half foot above high water mark of 1897, with crown four feet and slopes of two and two to one. Whilst this yardage is very much in excess of that covered by the resolutions of your Board, I would not advise that the dimensions of this levee be further reduced. for it would be tantamount to constructing a levee which would not serve the purpose of protection against a high water such as 1897. If the Lake Borgne Levee Board cannot see its way clear to pay for the total yardage in levee, as designed, it would be better to pay for only 20,000 cubic yards, than to reduce the dimensions of the embankment. The muck ditch as ordered, is of prescribed dimensions, and amounts to 2,500 cubic yards. This cannot be dispensed with, as the natural surface is more or less irregular from deposit, necessitating such a search ditch for the removing of buried logs, debris, etc., which might be found under the deposit in the base of the levee.

Messrs. Pleschia, Haspel, Mevers and Cosse, who expect to build this levee. have called and urged upon me to furnish station estimates, in order to facilitate their work. I have mailed station quantities to Mr. Pleschia, based on notes for construction previously furnished him. Should these notes be recalled, it will necessitate new calculations, and this means further delay in the prosecution of the work. As it is, it will take vigorous efforts on the parts of those directly interested, to build this levee before next high water.

Yours truly,
SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 8, 1896.

To the Honorable President and Members of the
Buras Levee Board:

GENTLEMEN—In accordance with your resolution of July 20, 1896, we have made an examination of the levee line between stations 200 and 331, in Section No. 1, and we beg leave to report as follows, an approximate yardage of earth work required to rebuild, raise and strengthen this stretch to a grade three feet above highest water, with crown six feet and slopes three and three to one:

SECTION NO. 1.

STATION TO STATION.	NUMBER OF CUBIC YARDS.	REMARKS.
200 to 217	10,464	New levee staked.
217 to 228	3,300	Enlargement.
243 to 255	3,600	Enlargement.
255 to 260	3,000	New levee.
260 to 269+74	3,000	Enlargement.
269+74 to 294	12,000	New levee.
294 to 331	11,100	Enlargement.
Total	46,464	

As regards specifications, we will be ready to furnish same when we know definitely the character of the work to be undertaken by your Board.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per SIDNEY F. LEWIS,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., December 22, 1897.

Hon. W. E. Hamilton, President Board of
Commissioners, Caddo Levee District, Shreveport, La.:

DEAR SIR—I have the honor to acknowledge the receipt of a notice from the Secretary of your Board, of a special meeting to be held on Thursday, the 23d inst., and, but for the fact that, while in Shreveport, Tuesday, I received the assurance from you that nothing was likely to come before your Board, in which my services would be necessary, I would certainly be with you. However, as promised you, I will submit a few items in the nature of a report.

The only point in the district where your levee line was immediately threatened by caving, at the beginning of the season, was at Logie Lea. Here the construction of a new line was undertaken by the State, and fortunately placed under contract before quarantine restrictions were put in force. This line of levee is 5,278 feet long, averages about 10.5 feet in height, and contains about 81,500 cubic yards of earth. It was let to Hunter Bros., of Shreveport, at 12.90 cents per cubic yard, which will make the cost of the work, when completed, $10,586.85. The work is over half-way completed.

In addition to this important work the State has, within the past week, arranged with Messrs. Hunter Bros., to build two other small pieces of levee in the district; one at Pascagoula Point, and the other at Long Point. These pieces of work are respectively 1,200 and 1,080 feet in length, will contain, in the aggregate, about 15,000 cubic yards, and cost about $1,948.50. This will be all the levee work which the State will be able to undertake in the Caddo Levee District this season, but it is reasonable to expect that an equal amount will be possible the coming season.

As a matter of special interest to your Board, I am, from a conversation very recently had with Major J. H. Willard, United States Engineer in charge of improvements on Red River, encouraged to believe that as much as two miles of the levee, required to close the gap in your line between Red Bayou and Sale and Murphy Canal, will be advertised for construction within the coming levee season, and placed under contract if anything like a favorable price per cubic yard be obtained. The work will commence at the upper end of the levee already completed above Red Bayou, and extend up stream to a safe point above Hervey's slough. It will require as much as 200,000 cubic yards of earthwork to build this part of the gap, and owing to the difficulties attached to reaching the locality, its comparative isolation from points of supply and labor, and the uninviting character of the work itself, its cost will be very large, probably as much as $50,000.00.

As I understand the situation, it is proposed to build the line to close this gap in about four sections, and in as many seasons. The next section to be undertaken to commence at the Sale and Murphy Canal. and extend *down* stream about two miles; the third section will be an extension, up or down stream, of sections one or two, as developments may determine, and the fourth section the final closure of the whole gap of eight miles.

Owing to the prevalence of yellow fever in our State, and the quarantine restrictions necessitated thereby, the Board of State Engineers has been unable to visit the levee districts as often as usual and desirable during the period when levee construction is usually under way, and the Caddo Levee Line has, therefore, not been inspected for quite a while, and I am, therefore, unable to speak as definitely about its present condition as a whole, as I would wish. However, within the past week, I have been over the lines, from Shreveport to

J. V. Hughes, and have noted a number of places where the levees are suffering seriously from many abuses, principally from the rooting of hogs.

The places on which the ravages of hogs are most noticeable, along that part of your line just visited, are Bagley, Levy's, Gailes, Woodlawn and Brown Place. Except at Woodlawn, the damage so far done is not material, the hogs having only just begun to sample the levees, but at Woodlawn the condition of the levee is simply shameful, and all owing to the rooting of hogs.

As stated before, I have not been able to visit the entire line in your district for some time past, but what is going on in that part visited may, from previous experience, be safely taken as a sample of what is occuring in a greater or less degree in other parts of the district, notably above Shreveport.

In this connection, I would beg leave to once more touch upon the question of the care, protection and preservation of the levees. It is only secondary in importance to their construction. Neglect means the early disintegration from natural and unnatural causes of the best system of levees that can possibly be devised and built, just as well as any other project and work in the country. The care of the levees devolves upon the Board of Levee Commissioners in the district, and properly involves the exercise of a wide field of interest and attention on their part. A failure on the part of the Board to encourage the observance of the laws governing the care of the levees, and to institute remedies for preventing abuses, must eventually result in disaster to the district, and reflection upon its officers.

Should a crevasse occur from the presence of trees in the embankment, from pathways and road cuts through it, from travel over it, and hogs rooting it, wearing it down and reducing its section, these cases of vandalism will not be remembered, except to declare the system a failure, and to characterize the members of the Levee Board as delinquents, if nothing worse.

I might write much more on this subject, but will not further take up your time, except to call your attention to the accompanying pamphlet marked A, prepared some years ago by the Board of State Engineers, for the information of those charged with the care, protection and preservation of levees which, in most respects, should still prove a fair guide to any one who is desirous of seriously considering the subject.

Please remember that whenever I can, in any way, be of service to your Board, you have but to advise me of the fact, and it will be promptly attended to.

Yours very respectfully,
F. M. KERR,
Assistant State Engineer.

A.

"SUGGESTIONS RELATIVE TO THE CARE, PRESERVATION AND PROTECTION OF THE PUBLIC LEVEES.

" Nearly all levee repairs can be made when the river is within its natural banks for a small fraction of the cost required when the water is well up against the levees. Considerations of economy, therefore, as well as the public safety, demand attention to such work during the season of low water.

" Leaking places, such as the holes of cray-fish and other burrowing animals, should be marked during high water, and when the river is lower, the levee should be dug into and the holes followed all the way through the bank with a trench, which should be refilled with earth, well rammed in as the filling progresses. Sometimes, where a great number of leaks occur near each other, they may be stopped (for the next season at least) by digging a ditch along near the foot of the river slope, lengthwise of the levee, deep enough to cut off the holes, and refilling same with earth well rammed.

"The closing of unlicensed rice-flumes and roadways is provided for by Act No. 88, of 1880, amended by Act No. 104, of 1882. These provisions of law should be more thoroughly enforced than they have been in some of the parishes. But in addition to this class of openings and cuts in the levees, there are in every parish innumerable minor defects caused by the gradual wear from ordinary travel, the passing of stock, the rooting of hogs, the natural abrasion by wind and rain, and especially by the washing of waves and the battering of drift logs during high water. These holes and deficiencies should be carefully refilled as early as possible every season, so as to give the fresh earth time to settle and bond itself with the old work, and to allow grass to grow and become well rooted on the new earth.

" In some parishes the tops of the levees are largely used as public roads. In such cases it would seem specially appropriate and important that the road overseers and road hands should be required to at least repair the damages caused by using the levees as roads.

"The best protective covering known for levees against the ordinary wear and tear of the elements is a close, clean sward of Bermuda grass. Its growth should be encouraged by transplanting sods where necessary, and by cutting down all weeds, bushes or other large plants, which tend to smother its development or unduly shade it. For the formation of a close, tough sod it is desirable to have the grass kept short. The pasturage of grazing stock upon the levee at all seasons, except during high water, is probably the best, as it is undoubtedly the cheapest, method of securing a good protective sward; though by a little care to insure that the grass is once well set, and an annual burning off when dry, it may generally be kept in good order as a protection.

"When levees run through the woods special care is required to secure a proper growth of grass. Brambles, vines and young trees are apt to spring up, and if not cleared away frequently, completely smother the grass. Trees growing on the levee should be cut down, and if of considerable size, their stumps should be thoroughly grubbed out by the roots. Trees growing near the levee should be felled whenever of sufficient size and height to fall upon and injure it if acidentally thrown down or blown over; but other timber, and especially undergrowth, between the levee and the bank of the river should, as far as possible, be preserved as a protection against waves and currents.

"A matter of great importance which should receive much more attention than has generally been given to it, is the planting of hedges or belts of saplings between the levees and the river bank. Under favorable circumstances willow stakes set along the foot of the levee, say in the edge of the barrow pits, can be induced to grow, and if several lines are thus planted and kept alive, they afford after a few years, with little attention or expense, an excellent protection against waves and drift logs. The bois d'arc, and other hedge plants, regularly planted and cared for as hedges, will give even better results.

"In some exposed situations, especially where the levee embankment is new, and not well settled and sodded, it is necessary to revet the side next the river with lumber. In most cases it is better not to place the revetment against the earth of the levee, but to leave an open space between it and the levee, so that in the proper season grass may grow there.

"A line of stakes or pickets firmly driven at intervals of a foot or less along the base of the levee with the space between the line of pickets and the levee filled in with straw, bagasse, cotton stalks, or small brush, forms a good revetment; but the material used for filling should be removed when the water is low, to allow grass to grow on the levee, and should be renewed shortly before the rising water comes against it.

"The batture and all space between the levee and the river bank should, if possible, be kept drained and free from water whenever the river is low enough to permit. This is necessary to prevent the ponds that naturally form in such places from becoming a harbor and breeding place for cray-fish and other burrowing animals. Suitable ditches for the purpose should be cut, and re-opened every season as the river declines. It is also important—for the same reason—and also to prevent a sudden rise of waters against the levees for which they may not be prepared, to keep such ditches open while the water rises, giving it gradual access to the levee. If possible, these ditches should be so arranged that there may be a *circulation* of water over the batture while the river is high, as the river water is then usually too cold to be attractive to most of the burrowing animals.

"Care should be taken in the location of such ditches that their outfalls are either properly graded, protected from washing in some way, or placed at points where they are not likely to produce very deep gullies and washes, especially on caving banks.

"On the land side of the levees, ditches should be opened and cleaned out before high water, to lead seepage water away from the levees as rapidly and thoroughly as possible, and the roads should not be crowded so closely upon the levees as to insure their becoming quagmires during high water.

"The building of houses and shanties upon the levees should not be permitted; and piles of wood and coal are often found upon or against them in situations likely to prove equally injurious, by preventing the growth of grass and harboring burrowing animals. In many places near mills and shops of various kinds, the levees have been covered or filled in with bagasse, chips, shavings, sawdust, ashes, loose shells, etc., etc., which are sometimes grassed over in a way to present an appearance of false security. Such localities should be carefully examined and their defects repaired during low water.

"In the high water season emergencies must be met as best they can be, and as they arise; but if the repairs here suggested receive attention while the water is low, the necessity for a large part of the anxiety and expense always attending the maintenance of the public levees during high water can surely be avoided."

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., October 1, 1896.

To the Honorable President and Members of the Board of Commissioners, Bossier Levee District, Bossier City, La.:

Dear Sirs—The Board of State Engineers would respectfully present for your consideration, at this time, a resume of operations in the district since July 15, 1892, the date at which your Board was organized, under the provisions of Act No. 89, of the session of the General Assembly of 1892, approved July 6, 1892.

With the exception of the Pandora and Sunny Point Levees, built just after the high water of 1890, no organized effort had previously been made by the local authorities to build levees in the parish, in anything like a comprehensive and systematic manner. Such levee building, as had at various points been imperatively demanded for the protection of the district previous to 1890, had been undertaken and executed in a more or less spasmodic way, either by the property owners immediately affected by high water, or by the State of Louisiana, with such small means as were, from time to time, available.

The result of these efforts, however, had, up to this time (1890), amounted to little more than the erection of short stretches of tentative barriers to the overflows which, from time to time, visited Red River, and these lines of levee, insufficient in grade and section, succumbed in many places to the high water of 1890, subjecting the parish to losses which were, at the time, considered disastrous and ruinous to its best interests, immediate and future, and caused many of the leading citizens of the parish to conclude that some systematic and organized effort *must* be locally made, to enable them to cope with similar emergencies in the future.

A decided step in this direction followed almost immediately, and the Police Jury of Bossier ordered an election to authorize the assessment and collection of a ten mill *ad valorem* tax to close the Pandora Crevasse, it being generally believed, at the time, that the crevasse of 1890, at that point, had inflicted the greatest amount of injury to the interests of the parish at large.

The amount collected from this tax was promptly applied to the construction of a new levee at Pandora, amounting to 86,504 cubic yards, costing $12,110.56. After providing for the Pandora Levee, it was found possible, by the Police Jury, to do somewhat more levee work out of this fund than that required at Pandora, and this balance was applied to the construction of a new levee at Sunny Point, amounting to 17,399 cubic yards, costing $2.390.62

This action of the Police Jury of Bossier parish was, at the time, generally recognized as commendable and wise in every particular. It was understood that the Police Jury of Bossier would continue to annually assess and collect this parish tax, and apply the proceeds to the betterment of the levees in the parish as long as needed. Unfortunately this provision was allowed, by the Police Jury, to fail in 1891.

After a short respite from the lessons and forcible impressions taught by the experiences of the overflow of 1890, the high water of 1892, the most serious of record that ever visited Red river, followed, and a great number of the other weak and insufficient levees in the parish were breached and washed away, converting the parish into an inland sea, and so devastating numerous places in the parish that numbers of its inhabitants were on the point of abandoning it. Public anxiety and sentiment was thus again aroused and it was generally felt and recognized that measures must be adopted, and means must be provided, to more intelligently and effectively cope with the dangers from high water with which the parish was, from time to time, evidently threatened by Red River.

Conferences between those interested finally led to a petition to the General Assembly of the State, in 1892, praying for the passage of an act permitting the formation of a Levee District, under the direction and control of a Board of Commissioners, with enlarged powers to assess, collect and apply taxes to the building and perfecting of a levee system. Similar action was, at the same time, taken in the parish of Caddo.

The enactment of these laws gave a most pronounced impetus to levee building on Red River, and has resulted in the wise expenditure of large sums of money for the ultimate protection of the district from high water, by the district, the State and the United States; the levees built so far aggregating 2,351,930 cubic yards, costing $334,097.59, exclusive of cost of administration, discounts, interest, etc., and presenting a continuous line of levee from near Hurricane Bluff to Arnold's, and from Dillard's to Buckhorn, a distance, by river, of seventy miles, the grade of which is not less than three feet above the highest water so far recorded in Red River, with slopes closely approximating three to one on each side, and a crown six feet wide.

The lapse in the line from Arnold's to Dillard's, a distance of five miles, apparently shown in the foregoing, is, however, also covered by a line of levees which, though in many places too close to the bank of the river, and insufficient in grade and section, as compared with the levees more recently built, has, with the care and attention so far bestowed upon it by those residing behind it and affected by it, succeeded in resisting the high waters of the past. It may thus be, therefore, said that the line of levee in the Bossier Levee District is practically continuous from a point near Hurricane Bluff to Buckhorn.

There is no doubt, however, but that the line from Arnold's to Dillard's should be improved in location, grade and section, at as early a date as possible, and that the line from Buckhorn to Swift Chute Bayou, the lower end of the district, should be built with equal promptness.

At this time the only work in progress in the district is at Buckhall, Cash Point and Pandora, under contracts recently let out by the State, and payable from the one mill tax for levee purposes imposed upon the State at large. This work amounts to upwards of 150,000 cubic yards, and will cost about $13,000.00. This will probably be all the levee work which the State will be able to undertake in the district this season. There is, however, some reason to believe that the United States may be able, at a later date, to also assist the district to some extent this season, and it is understood that Major J. H. Willard, United States Engineer in charge of Red River, has recommended the construction of levee work by the United States at Hall's (above Childer's), and from Magenta to Knox Point, amounting to about 125,000 cubic yards.

But, even if the district be fortunate enough to receive this outside aid, there will still remain the stretch from Jeter's to Dillard's, and from Buckhorn to Swift Chute Bayou, already referred to, for which nothing at all has, so far, been done. The Board of State Engineers, would, therefore, urgently recommend that the best efforts of the district be unremittingly continued to provide means to undertake the necessary work still required in the district, as well as for caring for, protecting, preserving and maintaining the lines built, and for putting into operation plans which will permit intelligent co-operation by the State and United States authorities in securing the best results for all concerned.

Gross abuses are constantly being visited upon the levees by travel, by the rooting of hogs, by the cutting of pathways and roadways through the leves, by permitting weeds and trees to overgrow them, and by the building of fences and placing obstructions upon them. These facts should be specially taken into consideration by the Board of Levee Commissioners, within whose hands the power to prevent these abuses fully rests, and every endeavor made on their part to remedy them, and to awake the proper public sentiment in support of their endeavors.

An impression seems to prevail among many in the district that no serious volume of water has passed down Red River at any one period since 1892. This impression is erroneous in the extreme, and it can be stated by those possessing a knowledge of the facts, that but for the levee work accomplished throughout the district since 1892, the disasters of 1890 and 1892 would, to a greater or less extent, have, undoubtedly, been repeated in 1894, and possibly in 1895.

In 1894 the river reached a stage of 33 feet at Fulton, and 34.5 at Shreveport, and the volume of water which passed down Red River at that period, with but one breach in the line of levee in Bossier (at Pruitt's) and one in Caddo (at Cash's), is estimated by competent authorities as closely approximating that of 1892.

Again, in 1895, the river rose to 31.4 feet at Fulton, and 30.3 feet at Shreveport, stages which had in the past caused great apprehension to all concerned about the safety of their property, but this flood passed down Red River almost unnoticed by the people of Bossier and Caddo.

In some directions, too, the sentiment is often expressed that extreme high waters in Red River are things of the past. The Board of State Engineers desires it to be known that no such sentiment exists with it. On the contrary, it is its belief that the future conduct of Red River, during periods of serious freshets, is largely conjectural, and likely to prove in many ways difficult to restrain, without continued vigorous and energetic provision for extending, improving and maintaining the levee system.

The seeming relief from the dangers of overflow with which the district has, for some time past, apparently been favored, is due to the fact that the floods of Red River are gradually being annually carried past your homes and your fields in better order, and, consequently, with less menace than was the rule before the levee work of the district was systematically begun.

The Board of State Engineers again takes occasion to say that it will at all times be pleased to render every service in its power required for the advancement of the interests of the district.

Respectfully submitted,

THE BOARD OF STATE ENGINEERS,
Per FRANK M. KERR,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA, March 16, 1897.

Hon. W. C. Vance, President Board of Commissioners,
Bossier Levee District, Shreveport, La.:

DEAR SIR—I would respectfully call your attention to the damage that has recently been inflicted by hogs upon the Scopini Levee, built by your Board in 1892-3.

You, of course, know that this line of levee is generally about the largest in the district and its maintenance is of the most vital importance to the lower part of your district. In fact, a failure to maintain this line of levee means, in the event of high water, untold disaster to the lower half of the district. These damages should be at once repaired and steps taken to prevent a repetition of them.

Of course, this condition of affairs in your district is, unfortunately, not confined to the Scopini Levee, but may be found to exist in many localities, and the Scopini Levee is mentioned in particular at this time only because of its very great importance to the lower part of the district, and because the damages inflicted upon it have only just come to my notice.

I hope that you may be able to give the matter the attention it demands, as well as the many other matters also deserving attention in the district. As you know, the line of public levees in the Bossier Levee District has been thoroughly well built, and where its effectiveness has not been impaired since completion by wanton neglect and abuse, should be equal to the task of safely carrying by your district as large a flood as has ever visited Red River in the past.

Though the air here is teeming with rumors of high water and probable disaster on the Mississippi River—in regard to which I do not, at this time, personally feel any great apprehension—Red River, so far, gives no indication of any abnormal condition of affairs in the near future. This fortunate outlook for Red River, however, may at any time receive a check, and changes follow which may cause considerable anxiety to all concerned.

I would, therefore, again most respectfully call your attention to the necessity of endeavoring to arouse the proper interest in levee matters in the district, and to secure to your levee line the care and attention it demands, the duty of doing which rests upon the Levee Boards by law.

Please let me know if I can, in any way, be of service in formulating or carrying out any plan of operations in the direction indicated, and I shall endeavor to promptly render all the assistance in my power.

Yours very truly,
THE BOARD OF STATE ENGINEES,
Per F. M. Kerr,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., September 2, 1897.

To the Honorable President and Members, Board of Commissioners, Bossier Levee District, Bossier City, La.:

Sirs—Having made an inspection of the entire levee line in your district within the past ten days, I would most respectfully report the following details in regard to its general condition, viz:

Abrams and Dixon Places: The levee here is overgrown with weeds and burrs, and occasionally with small cottonwood trees. The public road runs along the river edge of the base of the levee, and the travel upon it is wearing it away and causing injury to it, especially in bad weather. No particular changes have occured in the river bank.

Rough and Ready Place: Overgrown with weeds, burrs, vines and cottonwood trees, many of them three to four inches in diameter. This is one of the largest levees in the district, as well as one of the most important. It was also one of the most expensive pieces of work undertaken by the district, and some special effort should be made to save it from destruction, towards which it is fast going. Considerable caving has occurred opposite the upper portion of the line, but the rate of caving seems to have diminished lately, and no danger from it threatens the levee at this time.

Stinson Place: Condition of levee excellent, except a short stretch at the upper end of the dike across Old River, where it is somewhat ragged and worn by crossing.

Taylor Place: Condition generally fair, except for the fact that the top of levee is being used as a road for plantation hauling. Serious caving has occurred along the upper part of the line, and will, probably, continue and necessitate a new levee in the course of another season or two.

Ogden Place: Condition good, except for weeds and some young cottonwood trees in places. About opposite the middle of the place the river bank is caving considerably, and for about one thousand feet the width of batture does not exceed one hundred and fifty feet. A new levee will be needed at no distant day.

Gold Point Place: Condition good, except for weeds in places, especially near lower end. The road-crossing, too, is gradually wearing down the levee, and a large ditch dug along a part of the line, near the base of the levee on the land side, may ultimately prove a source of danger. No changes in bank have occurred affecting the line.

Riverside Place: Condition excellent, except opposite residence and quarters, where the levee is much disfigured and injured by crossings. There are some burrs and weeds here and there, and a few small cottonwood trees. Serious caving has occurred along the upper portion of the line, but the least bank so far is 275 feet.

Buck Hall Place: Along the front of store and residence the levee is in good condition, but will soon have to be substituted by a new levee on account of caving. From the old quarters to the lower end of line the levee is a mass of burrs, weeds, brush and small cottonwood trees. Considering that this levee has been put in perfect condition within less than a year, its present appearance is disgraceful, and warrants the assertion that unless shortly attended to, it will soon be in as bad a shape as before its repair. No changes of bank have so far occurred affecting this line.

Cash Point Place: Levee on upper side of point breached, and a new line is necessary. This will shortly be undertaken by the State. The new work of last year is overgrown with burrs, weeds and small trees, and is in a generally neglected condition. Near the junction of the new levee, with the enlargement, the sand bar that existed there has caved off, with indications of further inroads upon the bank.

Shady Grove Place: Badly disfigured and injured by stock at lower end of line. Several deep path cuts, and weedy in places. Caving serious, and likely to continue. Least width of batture, 180 feet. At the time of its construction, in 1892, it was about 500 feet.

Pandora Place (from Shady Grove line to Benoit Bayou): Badly disfigured and injured by hogs and stock. Caving serious.

Pandora Place (proper): New levee across point in fair condition, but weedy to some extent, and grass not well distributed.

From Arnold's to Jeter's: Deficient in grade and section, weedy and threatened by caving opposite Jeter's residence.

Colquitt Place: Deficient in grade and section, and some parts weedy. Opposite lower end of lane only seventy-five feet of batture remaining, and bank caving.

Cash Place: Deficient in grade and section, and overgrown with weeds, burrs, etc. Caving bank.

Hollingsworth Place: New levee in fair condition, but weedy and somewhat rain-washed in places.

Dillard's Place: Deficient in grade and section, and overgrown with burrs, weeds, etc. Also threatened by caving.

Bossier City Levee: Ragged and unkept, and disfigured by stock and travel.

Cain Place: Condition fair, except for weeds on part of it.

Vinson Place: Condition fair, except for crossings and some weeds.

Belcher Place: In places, especially near dike and around residence and quarters, ragged and worn and generally neglected.

Alexander and Blanchard Place: Levee completely overgrown with burrs, weeds, vines and cottonwood trees, and in places badly disfigured and injured by path cuts, old hog roots, and wagons encroaching upon land slide slope.

Chalk Level Place: Condition good. Bank gradually wearing, but safe for another season. Least width of batture about 145 feet.

Clay Place: Condition good, except for some weeds and occasional crossings. River bank wearing slowly opposite lower end, but no immediate danger.

Nicholson Place: Condition good, except some weeds.

Sunflower Place: Condition good, except some weeds and occasional crossings.

Curtis Place: Condition good.

Pruitt's Place: Condition good, except some weeds.

Sunny Point Place: Condition good.

Hall's Place: Condition good. Bank wearing slowly, but least width of batture still 175 feet.

Childer's Place: Condition good, except for some burrs in stretches, and that the levee is somewhat worn and disfigured opposite mule lot.

Scopini, Lattier, Mercer and Phillip's Places: Condition excellent.

Ash Point Place: Condition good, except stretch opposite residence and mule lot, where the levee is disfigured by old hog roots and stock crossing and standing on it.

Waterloo Place: Condition good, except stretch of levee in front of stables and residence, which is ragged, unkept and disfigured by stock and pathways.

Magenta Place: Condition good.

Gold Dust Place: Enlargement of last year overgrown with burrs. Caving bank, but not yet seriously near levee line.

Hopewell Place: Same as Gold Dust, with the addition that, at lower end of line, the levee has been badly cut up by stock and crossings.

Elm Grove Place: Condition generally good. Some caving, but not yet seriously near levee.

White House Place: Condition good, though somewhat weedy in spots.

Bates' Place: Condition good. Considerable caving has occurred in the bend near the lower line of the place, but a safe margin of batture, for the present, still exists.

Knox Point Place: Larger portion of levee generally rank with burrs, weeds, bushes, vines and cottonwood. Considerable caving in places, especially in vicinity of gin, but least width of batture still 250 feet.

Lovely Point Place: Condition good. Some caving along lower side of point, but not yet seriously near levee.

Furniss' Place: Weeds, vines, bushes and cottonwood in spots, but otherwise in fair condition.

China Grove: Long stretch overgrown with burrs, weeds, vines, bushes and cottonwood, and levee opposite lane, at upper end, badly disfigured by crossing, but otherwise in fair condition.

Christiana: Condition excellent.

Sixteenth Section: Largely overgrown with burrs, weeds, bushes, vines, etc., but otherwise in fair condition. The caving in the bend has been very serious, but since the occurrence of the cut-off through Campo Bello Point has ceased, no further alarm need be felt for the levee.

These details furnish you a basis upon which to estimate what ways and means are necessary to remedy the defects in the system, as far as at present designed, and, as the work required is principally in the nature of repairs necessary to the preservation of the line, I take the liberty of enclosing you a circular on the subject of the "Care, Preservation and Protection of Public Levees," prepared by the Board of State Engineers in 1883, for the information of police juries charged, at that time, with the duty of caring for the levees of the State, which is still largely applicable to the subject, as it presents itself for your consideration.

Your Board should, furthermore, not lose sight of the fact that there are many parts of the line threatened by caving in the near future; that all parts of the line are not up to a uniform grade and section, and that several miles of extension at the lower end of the district still remains to be done.

The Board of State Engineers will be pleased, at all times, to supply any information in its possession, and render any service in its power that may facilitate the operations of your Board.

Yours very respectfully,
THE BOARD OF STATE ENGINEERS,
Per F. M. KERR,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 15, 1897.

Hon. Jos. H. Meeker, President Board of Commissioners, Red River, Atchafalaya and Bayou Bœuf Levee District, Alexandria, La.:

DEAR SIR—As requested in your communication of November 2, 1896, enclosing the "Statement of Assessor of Avoyelles parish, showing a conflict of opinion between himself and the Texas & Pacific Railway Co.," the Board of State Engineers has made such surveys and examinations and taken such levels as were necessary, and now begs leave to report that the lands upon which the line of the Texas & Pacific Railway Co. in Avoyelles parish is built, are subject to overflow under the contingencies mentioned in Section 7, of Act 46, of 1892, namely: "in case there were no levees" protecting the Red River, Atchafalaya and Bayou Bœuf Levee District, or "in case where breaks or combination of breaks may occur in the system."

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per HENRY B. RICHARDSON,
Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., March 28, 1897.

Judge J. R. Thornton, Secretary Board of Commissioners, Red River, Atchafalaya and Bayou Bœuf Levee District, Alexandria, La.:

DEAR SIR—Your letter of the 26th, advising me of the meeting of your Board, called for next Wednesday evening, was received yesterday.

I fear that it will prove impossible for me to be present, owing to an appointment with Mr. Hamilton, President of the Caddo Levee Board, and a previous request to attend a meeting of the Bossier Board on Thursday, but if it be at all possible to arrange it, I shall, of course, be on hand.

As I now understand it, from conversation with Mr. Richard last week, and suggestions made to him by me, the object of the meeting is to review the condition of the district, owing to the probability of some parts of it being shortly visited by high water, and to adopt a policy in regard to meeting cases of emergency, etc., as the other districts in the State have done. I would say that the Commissioners are already so well informed in regard to the necessities of the district, that they should certainly be equal to a full consideration of the subject, without my aid.

Again, I think it is proposed, upon my suggestion, to make a thorough inspection of the district from Alexandria to Melville. In this particular, I can understand that it will be very necessary that I should be with the Commissioners, and I would say that if they conclude to make the inspection, and can conveniently postpone the day for beginning it to the Monday following, I shall, without fail, meet them at Alexandria, or at any other point they may designate.

The Mississippi River will undoubtedly reach a very high stage, and that part of your district near the lower end of Bayou des Glaizes, and thence down along the Atchafalaya, will be subjected to a considerable share of the dangers to which the levees on the Mississippi, at and below Red River Landing, will become exposed. On Red River, however, there is, in my opinion, nothing yet in sight to indicate any alarming stage of water.

Should you need to reach me during the coming week, please address me at Shreveport, care Phœnix Hotel.

Yours very truly,
F. M. KERR,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 3, 1896.

Capt. J. E. Trudeau, Levee Commissioner, Simmsport, La.:

DEAR SIR—The observations lately made by Mr. Lewis and myself at Mill Bayou Canal, along Cut-off Coulee, and across the basin between the Atchafalaya River and Bayou Rouge, on a line opposite the mouth of Turner's Bayou, leads us to conclude that little, if any, improvement can be made to the drainage of Big Bend through the canal and coulee, without extending the improvement on down through the chain of lakes, sloughs, bayous, etc., for many miles below.

The effectiveness of the canal and coulee has not been materially impaired since enlarged and cleared by your Board. There is somewhat more vegetable growth in the canal and coulee than at that time, and an appreciable amount of obstruction from fallen trees, fence crossings, deposit from plantation drainage ditches, remnants of bridges, etc., but nothing of so serious a character as to greatly affect the flow of water from Mill Bayou to the Cut-off road, or that could not be repaired at a very small expense. But until the level of the water in Bayou Choupique and Choupique Lake can be materially lowered, it seems to us of little avail to incur any expense whatever upon the approaches from above.

In regard to the levee across the basin and the diking of the bayous between the Atchafalaya and the Bayou Rouge, on a line opposite the mouth of Turner's Bayou, there is no doubt in our minds that it very materially affects the drainage of the section of country above.

In regard to placing syphons over Mill Bayou dike to assist in the drainage of Big Bend, we do not believe that results commensurate with the outlay would be obtained, nor in any way prove satisfactory.

Until provided with the means to systematically undertake the rectification of the entire chain of channels, from Mill Bayou south as far as it may prove necessary, by detailed surveys, it appears to us useless for your Board to attempt to give any further relief from rain overflow to the section in question. With regards, believe me,

Yours very truly,
THE BOARD OF STATE ENGINEERS,
Per F. M. Kerr,
Assistant State Engineer.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., July 7, 1897.

Hon. E. G. Richard, Acting President Board of Commissioners Red River, Atchafalaya and Bayou Bœuf Levee District, Alexandria, La.:

Sir—The flood of 1897 visited only the lower portion of your district,—that part extending along the Bayou des Glaizes and the Atchafalaya River. In Red River only an ordinary stage of water prevailed, the highest reading on the gauge at Alexandria being only 26.3, or twelve feet below the highest of record in 1892.

On Bayou des Glaizes, the high water of this year ranged from three-quarters of a foot below the highest of record at Bordelonville, in 1882, to two feet and a half above the highest on record at Simmsport. in 1893, and on the Atchafalaya River as follows:

At Simmsport	2.5 above 1893
At Woodville	2.2 above 1893
At Bayou Current	2.4 above 1893
At Nelson's	2.8 above 1893
At Melville	1.1 above 1893

From this it should be readily recognized with what a serious condition of affairs this section of the district was confronted. From April 15 to May 15, at which date the flood reached its greatest height, a struggle for protection to life and property followed, such as had never before been attempted in the district, and with results of which all interested and concerned should heartily congratulate themselves.

The most strenuous efforts to maintain the levees were promptly put forth by the district, and never before did the community generally so readily and energetically respond to the demands of the occasion, nor act with more harmony and good judgment in the common cause.

The only disaster to the district occurred on Bayou des Glaizes. Here, during a violent rain and wind storm on the afternoon of May 8, in what is commonly known as the "Ten Mile Stretch," the water ran over the top of the levee, breaching it in four places, as follows:

1st. At Longmire's, about ten miles above Hamburg. On May 29, the width of this crevasse was about 100 feet, and the average depth of flow about five feet. On May 10, upon the urgent pleading of the whole community, classing it as the most serious of the four breaks, the closure of this crevasse was undertaken, and all the necessary cribbing completed in a most satisfactory manner by the morning of the 12th, when sacking was begun. Everything being under water, and the section of the existing levee being so slight, the sacks had to be filled a mile away from the crevasse, and brought by boat, thus entailing such delay as to cause a portion of the crib work to wash up. This damage to the work was repaired, but the delay in delivering sacks grew greater each hour, was suspended entirely for the night, and by the next day at noon, May 13, some fifty feet of the cribbing washed up. It then being evident that no improvement in delivering sacks was likely to be made, it was finally determined to simply secure the ends of the crib work. In this way the opening at Longmire's was confined to about eighty (80) feet in width for the remainder of the period of high water on Bayou des Glaizes.

The rains which set in on May 8 continued during the greater part of the day and night up to the 13th.

2d. At Paulin J. Coco's, about three miles above Hamburg. The width of this crevasse on May 9 was also about 100 feet, but the average depth of flood did not exceed three feet.

No attempt to close this crevasse was made until May 17, by which time it had attained a width of about 600 feet. After a week's labor with an insufficient force and inferior transportation, all material having to be boated from the Kellar place, four miles below, this crevasse was closed on the morning of May 23. The length of the crib work constructed was about 700 feet. The average depth of the water against the dam, after closure, was about four feet. The weather during the entire week was clear and favorable.

3d. At Mrs. Bruilty's, about four miles above Hamburg, on May 9, when this place was visited, two crevasses were found, about a half a mile apart, one about seventy-five feet wide, and the other about 250 feet wide, The average depth of flow was about two and a half feet. An attempt was made by the residents of the vicinity, aided by foremen in the employ of the district, to close the smaller break, but, owing to absence of organization and sufficient material, it was abandoned, after nearly completing a line of crib work across it.

These two breaks finally merged into one, the width of which was, on May 23, about 2,800 feet. Owing to the impossibility of securing the necessary transportation, no effort was made to close this crevasse.

As stated before, all these crevasses occurred in what is known, locally, as the "Ten Mile Stretch," extending from Mill Bayou to Spurlocks, about opposite Bayou Dan.

Owing to the fact that the bank of Bayou des Glaizes, along this stretch, was naturally high, and special apprehension for the safety of the district had never been felt from it in the high waters of the past, the levee line there had never been improved to the section of the levees on other parts of the public system of the district. It consisted generally of such hurried work as the residents of the Bayou had, from time to time, seen fit to erect as the necessity presented itself.

Upon the approach of the high water of this season, however, it became evident, at an early date, that this stretch of levee was destined to be called upon to restrain a much higher stage of water than usual, and the district at once took steps to sufficiently improve it to meet the emergency, Very nearly the entire length of ten miles was thus raised and enlarged, and the greater part of it substantially revetted, in about six weeks; the line successfully resisting the water to within a very small margin of its final crest, and only giving away at the points described, and in consequence of the severity of the weather.

There is not the slightest doubt in the minds of any properly informed on the subject that but for the work done by the district on this line of levee, the entire ten miles would have succumbed in the early stages of the flood, and caused an overflow in the parishes of Avoyelles and St. Landry exceeding in extent and injury anything in the past.

As it was, the cultivatable area overflowed from the water which escaped through these crevasses on Bayou des Glaizes did not materially extend beyond the lands in Big Bend, a portion of those adjacent to Bayou Choupique and Bayou Jack, and about one thousand acres on the rear of places fronting the Atchafalaya River below Yellow Bayou.

The balance of the levee line on Bayou des Glaizes and the Atchafalaya River remained intact.

In many places, however, but for the capping and revetting done, the water would have run over the top of the levee, and in very few places was the margin of safety between the tops of the levees and the surface of the water in the river sufficient to arouse any degree of enthusiasm. As a general thing, the levees proved tight and sound, but little sloughing from seepage, or leaks from crayfish holes developing, and in the few places where anything of the kind occurred the defects were intelligently and effectively controlled.

As a matter of course, after such a trying experience, your district will not be surprised to find itself confronted with a very large amount of work which it certainly appears necessary to do to adjust the condition of you levee line to a proper degree of security.

Not to go too much into detail, the work before you is herein divided into two classes: that which should be done this season, if the means are at all available, and that which it seems unavoidable to do to guard against certainty of disaster at the next extreme high water in the district.

Under the first head the estimate is as follows: On Red River, 150,000 cubic yards; on Bayou des Glaizes, 750,000 cubic yards; on Atchafalaya River, 850,000 cubic yards; total, 1,750,000 cubic yards.

Under the second head, the estimate is given in more detail, as follows:

AVOYELLES PARISH.—*On Bayou des Glaizes.*

Bordelonville to Gray's	100,000 cubic yards
Spurlocks to Mill Bayou	275,000 cubic yards
Howard	25,000 cubic yards
Wayside	20,000 cubic yards
Yellow Bayou to Simmsport	80,000 cubic yards
Total	500,000 cubic yards

On the Atchafalaya.

Cason and Delee	75,000 cubic yards
Green Store	25,000 cubic yards
Total	100,000 cubic yards

ST. LANDRY PARISH.—*On the Atchafalaya.*

Rogers	10,000 cubic yards
Dubose	15,000 cubic yards
Cap. Gordon	30,000 cubic yards
Bayou Current	10,000 cubic yards
Elba	25,000 cubic yards
Churchville	10,000 cubic yards
Total	100,000 cubic yards

RECAPITULATION.—AVOYELLES PARISH.

On Bayou des Glaizes	500,000 cubic yards
On Atchafalaya	100,000 cubic yards

ST. LANDRY PARISH.

On Atchafalaya	100,000 cubic yards
Total	700,000 cubic yards

At this date it is not possible to report definitely what amount the State may be able to allot to the district, but it is to be hoped that in addition to the $5,000.00 already contracted against out of the Nachitoches sub-district Levee Fund, for the construction of the Belleview

Levee, in the parish of Rapides, as much as $10,000.00 may be spared to the district from the General Engineer Fund, later on.

Since the Board of State Engineers last had occasion to report to your Board, the following levee work, payable from State funds, has been completed in the district:

NAME OF LEVEE.	NUMBER OF CUBIC YARDS.	COST.
Alexandria	16,595	$ 2,613 70
Sandy Bayou	6,299	992 10
Cut-off Bayou to Ashton	49,613	3,472 91
Overton	71,997	6,285 33
Sunny Home	3,804	332 08
Total	148,308	$13,696 12

Average price per cubic yard about nine and one-fourth cents.

Since the subsidence of the flood the question has often been asked: "What lessons have been learned from the experience of this year's high water and the conduct of the levees?" Much, too, has been said and written on the subject. As a matter of fact, however, nothing new was demonstrated, but overwhelming evidence adduced that the proper kind of levees, under the proper organization, system and care *will* protect from overflow; and that the proper kind of levees are simply such as are intelligently located, built of clear earth, upon a carefully prepared base, to a proper grade and section, turfed with Bermuda grass, and kept thoroughly drained on both sides during periods of low water, and on the land side at all time. This means money, organization, system, a vigorous application of the laws governing the care, maintenance and preservation of the completed levee, and preparing in low water for the exigencies of high water.

The Board of State Engineers hopes that your district will be able to obtain the resources necessary to enable you to continue the good work that has so far characterized your efforts to protect it, and will always gladly and promptly render you any assistance in its power to further your plans.

Deeply feeling the loss which your Board and the District has recently sustained in the death of your late President, the Hon. Jos. H. Meeker, permit us to record the very high regard and appreciation in which he was held by us, and to express our sincere regrets at his demise.

Yours very respectfully,
THE BOARD OF STATE ENGINEERS,
Per FRANK M. KERR,
Assistant State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., October 8, 1897.

Judge J. R. Thornton, Secretary Board of Commissioners, Red River, Atchafalaya and Bayou Bœuf Levee District, Alexandria, La.:

DEAR SIR—I had hoped to be able to write to you somewhat earlier in regard to the levee work required this season on Bayou des Glaizes, the surveys having been returned shortly after I saw you, but owing to the illness of three of my children, attacked by the prevailing fever, and the consequent quarantine restrictions placed upon my home, keeping me a prisoner up to this week, I have been compelled to delay the matter. It is, however, getting late in the season, and no further delay should occur in seriously considering the matter at any rate.

The "Ten Mile Stretch" on Bayou des Glaizes is, as you know, in no condition to meet another high water; in fact, it offers now, more than ever, a tempting invitation to the first flood visiting the State to enter your district and overflow the greater parts of the parishes of Avoyelles and St. Landry, comprised within the limits of the district.

Unless this line of levee is built up this season, or a levee is built across the neck of Big Bend, from a point just below the Gray Place to a point just below Mill Bayou, there is no reason to hope that that portion of the district referred to can possibly escape a serious inundation at the next high water.

There are no unusual difficulties of construction attached to the building of either of the lines.

The only question which, as I understand, appears to present itself, is the financial ability of your Board to undertake the work, and this, in the opinion of the Board of State Engineers, should be determined and announced, one way or the other, without further loss of time, in order that those interested may, well in advance, be able to consider the grave situation confronting them in the event of the inability of the district to do the work.

The line of levee required to secure the "Ten Mile Stretch" will consist partly of enlargement and partly of new levee, be 55,400 feet long, and, with a grade three feet above the high water of 1897, crown six feet wide, slopes of three and three to one, muck ditch, etc., will involve the placement of 375,000 cubic yards of earthwork. The line across from Gray's, to Mill Bayou, will be 11,614 feet long, and, with the same grade, crown and slopes, muck ditch and banquette, will call for the handling of 175,000 cubic yards of earthwork.

Judging from the prices for levee work prevailing this season, the cost of the levees along the the "Ten Mile Stretch" should not exceed thirteen (13) cents per cubic yard, while for that across the neck it would not be safe to depend upon less than eighteen (18) cents.

This means about $48,750 net for the one, and about $31,300 net for the other line.

In view, however, of the limited means of the district, the dimensions of these lines might be reduced to some extent, as follows: (The levee built to be afterward enlarged, if the necessity presents itself), say grade two (2) feet above the high water of 1897, crown six (6) feet, slopes two and one-half and two and one-half to one, and omitting the muck ditch from the "Ten Mile Stretch."

This would reduce the quantities and cost of the lines described about as follows:

Ten Mile Stretch, 220,000 cubic yards, cost $28,600.00.

Cut Off (Gray to Mill Bayou), 120,000 cubic yards, cost $21,600.00.

If your district can possibly secure the means to build up the line along the " Ten Mile Stretch," and continue, from time to time, thereafter, the improvement of the line around Big Bend, it is unquestionably the proper and the best course to pursue. But the inability of the district to undertake the larger work should not operate against undertaking the smaller, if the latter be possible, as this line, though excluding Big Bend from the benefits of protection from overflow by the district, would, at all events, secure it to the balance of the district.

Judging from conversations had with several parties, I do not think that your Board would encounter much difficulty in putting this work, that is, the long line, at any rate, under contract on long time payments.

It would not, in my opinion, be necessary to go through the usual form of advertising for bids, but better to try and reach by letter some two or three responsible parties, understood to possess the means to carry on the work under such terms, and under the emergency clause, which exists at this time, if ever one did, make the necessary contract to do the work, if a reasonable proposal be received. In this connection, I would name S. D. Moody & Co., Limited, New Orleans, La.; Jas. A. Andrews, Baton Rouge; Wm. Robson & Son; Robson & M. L. Linnan, Viva, Pointe Coupee Parish, La.

The experience of the high water of 1897, when, at the last moment, and under the most adverse conditions, the district was forced to put out large sums of money in battling against overflow in this very locality, are, I know, still fresh in your mind.

If this work on Bayou des Glaizes is not taken hold of and completed in time a repetition of these experiences is certain, and in, no doubt, a more persistent and aggravated form.

Owing to the rigor of quaratine restrictions throughout the State, I presume this matter will have to be considered by letter, and to facilitate your promptly presenting it to the members of the Board, I enclose you three copies of this letter for their information, if, in your judgment, you think it sufficiently explicit.

Yours very respectfully,

F. M. KERR,

Assistant State Engineer.

APPENDIX C.

Sundry Special Reports to the Governor, with letters
to the Mississippi River Commission, United
States Engineers, and others, and
tabular statement furnished to
sub-committee of the United
States Senate Committee
on Commerce.

APPENDIX C.

SUNDRY SPECIAL REPORTS TO THE GOVERNOR, WITH LETTERS TO THE MISSISSIPPI RIVER COMMISSION, UNITED STATES ENGINEERS, AND OTHERS, AND TABULAR STATEMENTS FURNISHED TO SUB-COMMITTEE OF THE UNITED STATES SENATE COMMITTEE ON COMMERCE.

SPECIAL REPORT RELATIVE TO "BAPTIST COLLET CANAL."

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., January 5, 1897.

To His Excellency Murphy J. Foster, Governor of Louisiana:

SIR—House Concurrent Resolution No. 48, approved July 7, 1896, authorizes the Board of State Engineers to examine the "Baptist Collet Canal," on the east bank of the Mississippi River, in the parish of Plaquemines; and if in their judgment "the proper control of the river is in any way endangered by this outlet, to close the same."

Having made the examination contemplated in the above named resolution, we beg to report the following for your Excellency's information:

Baptist Collet's Bayou, as it is called on the charts of the U. S. Coast Survey, cuts through the left bank of the Mississippi about eight and three-fourth miles below Fort Saint Philip, and forms a constant outlet into Bird Island Sound Its length between defined banks, from the river to open water in the sound, was in 1870 only about a half-mile; though by 1893 it had built out a delta formation with several mouths, some of the channels measuring fully two miles in length between the river and the sound.

The extent of this accretion shows that a large volume of muddy river water has been discharged through the outlet, depositing its silt in the calmer area of the sound. During floods in the river it is possible that the discharge may have been nearly one per cent. of the whole volume of the river. The discharge of such a volume involves a current of sufficient velocity to produce considerable scour; and it is probable that the bayou or canal has been decidedly enlarged by the erosion of its bed; though a comparison of the chart of surveys made by the U. S. Coast Survey about 1870, with that of the U. S. Mississippi River Commission in 1893, does not show any material increase in width during the interval of twenty-three or twenty-four years between the surveys, except for a short distance near the river bank.

Three sections across the bayou, taken by us on October 27, 1896, between 600 and 850 feet back from the river bank, show a least width between banks of 140 feet, and an extreme depth of twenty-eight feet; the water in the river at that time being low (1.96 feet on the Fort Jackson gauge; *i.e.*, very near mean gulf level), with a gentle outward current in the bayou. Its banks were then about two and one-half feet above the water surface. During extreme floods they have probably been one to two feet under water.

The soundings and measurements made at this time compared with those shown on the field charts of the survey made by the Mississippi River Commission, in 1893, show that during the past three years the Baptist Collet Bayou has not increased in width or depth; and it appears likely that this outlet has already passed its period of enlargement, and is now employed, like some of the other outlets, such as Cubitt's Gap and the Jump, in lengthening and closing its channels with deposits of silt.

At all events, we see no reason to apprehend that "the proper control of the river is in anywise endangered" by it at this time. If at any future date it should develop such danger, it is to be presumed that the Federal Government, through the Mississippi River Commission, would take steps to avert it.

While it may be true at this time, as recited in the preamble to the resolution, that this outlet "is doing serious harm to the oyster industry there established," it can hardly be disputed that the future development of the delta formation now in progress there, will tend to produce conditions favorable to the planting and growth of oysters; so that the final result may prove of benefit to the industry and a source of revenue to the State.

Considering the circumstances of the case, as above stated, it is, perhaps, needless to call attention to the fact that, while Concurrent Resolution No. 48 gives authority to close the outlet, it fails to make any provision for the cost. If its closure were considered necessary in the interest of the oyster industry, it would seem just and proper that a legislative appropriation should be made for the purpose from the "oyster fund." The amount required cannot be stated with much certainty; but if $12,000.00, "or so much thereof as may be necessary," were made available, it would probably suffice to build a suitable dike and wing levees; and if the work were undertaken at a favorable time and completed without accident, it might cost very much less.

Respectfully submitted,
THE BOARD OF STATE ENGINEERS,
Per Henry B. Richardson,
Chief State Engineer.

SPECIAL REPORT RELATIVE TO CERTAIN STATISTICS ASKED FOR.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 29, 1897.

His Excellency Murphy J. Foster, Governor of Louisiana,
Baton Rouge, La.:

SIR—I have the honor to transmit to you, to-day, the following items of information which, I think, from the information given to me by Mr. Perrilliat, should serve as a basis for what you have in mind:

1st. The ten regular levee districts of the State as now constituted, and in which levee work is being pursued, embrace an area of about 9,500,000 acres, of which about 1,500,000 may be classed, at this date, as cultivated lands.

2d. During the overflow of 1882 about seventy-five per cent. of the area of the districts, as above, was submerged, that is, about 7,125,000 acres, of which fully 1,000,000 acres was cultivable land; in 1897 only about fifteen per cent. of the same area, or about 1,425,000 acres was under water, of which less than 100,000 acres were cultivable land.

3d. The length of the levee line in Louisiana and in Arkansas, affecting Louisiana on the Mississippi River and interior streams, after the overflow of 1882, was about 1,165 miles; in 1897 it is about 1,278 miles.

4th. The contents of the controlling line of levee in Louisiana and in Arkansas, affecting Louisiana on the Mississippi River and interior streams, after the overflow of 1882, was about 32,000,000 cubic yards; in 1897 it is about 96,000,000 cubic yards.

5th. The number of cubic yards of earthwork in the same line, lost from changes of location necessitated by caving banks and crevasses, from 1882 to 1897, is about 22,000,000.

6th. During the high water of 1882 about eighty-two crevasses occurred in Louisiana and in Arkansas, affecting Louisiana on the Mississippi River, the aggregate width of which was about thirty-four and two-fifth miles; in 1892 the crevasses on the Mississippi River and interior streams, as recorded, numbered fifty-two, aggregating six and one-third miles in width; in 1893, sixteen crevasses are on record, aggregating about two miles in width; in 1897, there were twelve crevasses in the State, all told, aggregating one and three-fourth miles in width.

7th. The total amount and cost of levee work in Louisiana and in Arkansas, affecting Louisiana, from 1865 to 1897, is as follows:

	CUBIC YARDS.	COST.
By the State and Levee Districts of the State..	75,080,878	$21,069,988.53
By the U. S. Gov. (commencing in 1882).........	35,726,288	6,338,122.17
Total	110,807,158	$27,408,110.70

I might further add, that on page 154, Report of the Board of State Engineers, April 20, 1892, to April 20, 1894, a special report in regard to the high water of 1893 appears, from which much valuable information on the subject may be obtained. And on page 19, Report of the Board of State Engineers, April 20, 1894, to April 20, 1896, will be found a review of the conditions of the levees in 1882 and in 1896, the graphic contrast of which cannot well be improved upon.

Yours very respectfully and truly,
F. M. KERR,
Assistant State Engineer.

LETTER RELATIVE TO FLOOD OF 1897, EFFICIENCY OF LEVEES, ETC.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 3, 1897.

Col. G. L. Gillespie, Corps of Engineers, U. S. Army, President Mississippi River Commission, Army Building, New York City:

DEAR SIR—In compliance with the request contained in your letter of April 21, ulto., that I report for the information of the Mississippi River Commission my "views and conclusions as to what has been demonstrated by this flood touching the efficiency of the levees as constructed and contemplated, as a means to control the flood waters, and what changes, if any," I would recommend "in existing grades, cross-sections and general policy," I have the honor to submit the following, premising that, except where otherwise stated, the levees referred to are those protecting the alluvial lands of the State of Louisiana:

EFFICIENCY OF THE LEVEES AS CONSTRUCTED.

The lines of levee upon the efficiency of which the lowlands of Louisiana depend for direct protection against overflow by the flood waters of the Mississippi River, extend, on the right bank, from Costello's Gin, on Amos Bayou, Ark., to the Jump, near the head of the Passes; and on the left bank, from Baton Rouge to Bohemia.

On the right bank, just previous to the present flood, the line was continuous, except the outlet openings into the head of the Atchafalaya River and into Bayou Lafourche, and the gap of about twenty-six miles below Bougere Landing and the mouth of Red River—which has remained practically unleveed for the past thirty years. During this flood four crevasses occurred in this line which have not been closed, all of them above the mouth of Red River.

On the left bank the line, previous to the flood, was unbroken, and remained intact until the break at Conrad Point, May 30, when the crest of the flood had passed and the water had fallen some two and a half feet.

The present flood of the Mississippi River has also called into service the levees on the Atchafalaya River and on Bayou des Glaizes and Lafourche. Three small crevasses occurred on Bayou des Glaizes in a part of the line where the natural bank is so high that slight levees have been built there only upon the approach of high water—while there were three crevasses in the lower part of the levee system on Bayou Lafourche.

The total length of the levee lines above referred to is 816 miles on the Mississippi River, and 256 miles on interior streams, an aggregate of 1,072 miles. The total width of crevasses is about one mile on the Mississippi River, and less than three-quarters of a mile on interior streams, an aggregate of one and three-quarter miles. That is, $99\frac{87}{100}$ per cent. of the levee line on the Mississippi River upon which Louisiana is directly dependent for protection, and $99\frac{71}{100}$ per cent. of the line in service this season on her interior streams, or $99\frac{84}{100}$ per cent. of the aggregate remains intact, and is now as thoroughly efficient as it was before the flood.

The familiar saying, "a chain is no stronger than its weakest link," so often quoted in connection with levees, fails in application in many cases, and is especially inapplicable this season so far as levees protecting Louisana are concerned. The broken links in this chain of levees have been so near its ends as to leave the body of the chain sound, strong and efficient for the control of the flood. While the Biggs and Reid crevasses may be said to have broken one of the chains near its middle, producing overflow for thirty miles in a direct line above, and for more than twice that distance below, it should be noted that all the others referred to, except that at Conrad Point, were so near the lower ends of the systems in which they occurred, or else on such high ground, that their effect was limited and local. The crevasses near the lower end of the levees on Bayou Lafourche have their outfalls almost at the edge of the sea marsh, and overflow but small areas of cultivable land; while those on Bayou des Glaizes and Amos Bayou were on comparatively high ridges, and their outlet capacity was insignificant. The crevasse at Glasscock's was so near the lower end of the Tensas Basin system that its overflow hardly added anything appreciable to the depth or area already overflowed by the water backing up through the unleveed front below Bougere Landing. The area of overflow caused by this unleveed front (Bougere to mouth of Red) was probably more than a third of the total area overflowed this season in the entire Tensas Basin, so that this large area would still have been inundated even if the levees above Bougere Landing had continued absolutely efficient throughout the flood period.

The crevasse at Conrad Point is not far from the upper end of the Pontchartrain Basin, and had it happened at an earlier date, before the river began to decline, it might have flooded a considerably wider area than now seems probable. Its occurence, after the river had been fall-ing for two weeks, in a levee which had been maintained during all the time the flood was passing by in full volume, detracts nothing from the facts which show the general efficiency of the levees for the control of the flood in Louisiana, however disappointing it may be or injurious in its effects.

The area of the Pontchartrain, Lafourche and Atchafalaya Basins, lying wholly in Louisiana, and of the Tensas Basin, lying in Louisiana and Arkansas, as given on the "Map of the Alluvial Valley of the Mississippi River," published by the Mississippi River Commission, is 15,065 square miles, while the value of the taxable property, as shown by official tax rolls is, in round figures, $180,000,000 in Louisiana alone. There can hardly be a reasonable doubt that nearly every acre of this vast territory would have been deluged by the great flood which has just passed down the Mississippi River had there been no levees to prevent. As a matter of fact, however, this flood was so efficiently controlled by levees that over eighty-five per cent. of the gross area of these lands was completely protected from any overflow escaping through the crevasses of this season.

This estimated eighty-five per cent. of gross area, of course, includes a vastly greater proportion than eighty-five per cent. of the land open to cultivation. The lands cleared, or opened for cultivation, have naturally always been those on the highest ridges and least subject to overflow, so that any fair estimate of the cultivable lands overflowed by water from the crevasses which have occurred during the present flood, must be but a small fraction of the total area flooded. For instance, in the parish of Tensas, which lies immediately below the Biggs and Reid Crevasses, and over which all the water flowed which they discharged, it has been estimated by competent judges that not more than twenty-two and a half per cent. of the cultivated land was overflowed this season.

Notwithstanding the fact that this flood reached much higher stages in the river than any previously recorded, by nearly three and a half feet along some parts of the levee lines in Louisiana, and by over two feet against the major part of them, it is to be noted that every drop of it (except the insignificant volume escaping through the crevasses on Bayou des Glaizes) was successfully carried between levees, from the head of the Atchafalaya Basin to the end of the levee systems near the Gulf. Not until two weeks after the flood had culminated, and it had fallen two and a half feet, was there any break in the levee or escape of flood waters through crevasses below the mouth of Red River, on either the Mississippi or the Atchafalaya, and on Bayou Lafourche, only after passing forty miles down the stream between levees.

This flood was certainly held in complete control until two weeks after its crest had passed in the Mississippi, from the head of the

Atchafalaya to Bohemia, a distance of 257 miles; in the Atchafalaya, from its head to Melville, a distance of thirty-five miles, and in Bayou Lafourche, from its head to below the Southern Pacific Railway Crossing, a distance of forty miles,

This efficiency of control was partly due to the immense amount of labor and material expended by your executive officers, by the local levee Boards, and by private parties, during the progress of the flood, for the protection and preservation of the levees. But the fact should not be lost sight of, that the major part of the work thus done was applied to giving a greater margin of height to the existing line, and that, while hundreds of miles of levees were raised with earth and planks, or sacks, the water at the highest stage of the flood did not really touch but a very small proportion of this emergency work, although it could not have been foreseen that this would be the case. From this it plainly appears that these levee lines had a larger capacity for the control of this flood than that with which they were credited.

A system of levees that prevents overflow along 800 miles of river bank during such a flood as that now passing out of the water courses of the Mississippi Valley; that holds water five to fifteen feet in depth, and often more, above the natural banks, and up to its very brim; that withstands the wear and strain of such a flood with a loss of only one-sixth of one per cent. of its length; that absolutely protects eighty-five per cent. of a territory containing an area of 15,000 square miles, and property values of $180,000,000.00, against complete inundation, inevitable without it; that subjects the entire volume of such a flood to absolute control throughout a length of 330 miles of leveed water courses; such a system of levees surely cannot be characterized as inefficient. Few great works or enterprises have achieved a greater degree of success, and probably none while in the incomplete condition of the existing levee system of Louisiana.

GRADES, SECTIONS, ETC., CONTEMPLATED.

The general grade of the existing levees protecting Louisiana appears to have been barely high enough to hold the late flood along a large part of the line below the mouth of Red River, and much of it between the mouths of the Red River and Arkansas, at least along the upper part of the "Tensas front," would have proved insufficient but for the local depression in flood levels caused by the crevasses in Mississippi. The return of this crevasse water at the lower end of the Yazoo Basin, above Vicksburg, restored to the river its full flood volume, probably producing a higher stage in that vicinity than would have occurred had there been no crevasses in the levees on the "Yazoo front." The increment of flood stage at and near Vicksburg was limited, perhaps to some extent neutralized, by the Biggs and Reid Crevasses just below. That a corresponding abnormal increase of flood stage did not manifest itself near the mouth of Red River upon the return of crevasse water at the foot of the Tensas Basin, is probably a phenomenon more apparent than real, and due to the fact that Red River failed to supply its usual flood contributions.

But whatever may be concluded as to the effect of the crevasses which occurred during the late flood, there can be no reasonable doubt that had its volume been swollen by such quantities of water as have frequently come down the Red and the Arkansas in other flood years, the existing grade of the greater part of the whole levee line would have proved inadequate for efficient control

The biennial report of the Louisiana Board of State Engineers of April 20, 1894, has the following statement, which still fairly expresses the attitude of that Board as regards the subject of levee grades: "The truth is, that so long as the height which will be reached by extreme floods when entirely confined between levees, is not ascertained by actual experiment through a series of flood years, the final standard of height can only be provisionally determined."

The experience gained since the date above named has not given us sufficient data for final conclusions upon this all-important question. Nothing, however, has been developed by the late flood to impair confidence in the sufficiency of the grades proposed by your Committee on Levees, as stated in Appendix 4, p. 3461, Report Mississippi River Commission, July 1, 1896. Practically this same grade was provisionally adopted by the Louisiana Board of State Engineers for levees below the head of Bayou Lafourche, as reported to the Mississippi River Commission in a letter of August 22, 1896 (a copy of which is appended hereto), and such work as has been done on these levees by the State and local levee Boards since that date has been in general accordance with the grades therein described. At that date it was thought hardly feasible with the means available to undertake the general raising of levee grades above the head of Bayou Lafourche to a height greater than five feet above the plane of highest water of previous years. A better plane of reference, it is now considered, would be the high water of the late flood, and that a grade line three feet above the high water plane of 1897 is a reasonable tentative standard to be worked to for the present; though on all parts of the line where five feet above previous high waters gives a higher grade, the latter is to be preferred.

As a matter of course, it would be better economy to build at once to the still higher grades contemplated in the report of your Committee referred to, should it appear that the available means and the time requisite for executing the work would warrant such an undertaking.

As to the form of cross-section best adapted to fulfill the purposes for which levees are designed, it can hardly be said that anything new has been demonstrated by the experience of this flood.

That form of embankment that will best retain its shape when completely saturated with water still seems the best and safest. As the lower portions of a levee are generally less dry than the upper parts, there may be reason in giving the section flatter slopes towards the base than near the top; but, generally speaking, the form of section having a bench or "banquette" on the land side seems to serve all the purposes of a flattened slope, and indeed approaches the usual form naturally taken when it sloughs down and comes to rest in a position of stable equilibrium. Moreover, such banquettes may generally be easily added to the existing levees without the danger of serious sloughing during high water, which always in some degree attends the enlargement of a levee by adding to its comparatively steep land side face a thin wedge of earth, though of considerably flatter slope.

Levees built of almost any sort of earth with side slopes of one on three have generally stood without any sloughing of consequence, wherever the seepage water was well drained away from the base; but when drainage is deficient, and also where the soil appears excessively loose and friable, the addition of a banquette, or construction with a flatter land side slope, is found to give stability.

The width of crown may properly vary according to the degree in which the levee is exposed to the washing of waves and with the friability of the soil, also, to some extent, with the height; but in general, a width of ten or twelve feet seems sufficient. The practice of raising the middle of the crown considerably above the edges has the advantage of shedding rain-water promptly, and thus preventing the formation of gullies down the sides; but it is open to question whether it does not also somewhat retard the settling together and solidifying of the embankment, which it is desirable to have take place as early as possible.

The proper allowance to be made for the settling or subsidence of embankments is a fruitful source of disagreement between engineers and contractors. The Louisiana practice for a number of years past has been to make it a matter of contract that a "net cubic yard of solid earth, equal to five-sixths of a gross cubic yard of loose earth" is the unit of measurement. This definition of the cubic yard was adopted at a time when most of the levee work was done with wheel-barrows, and there has been very little room for disagreements as to its meaning. But since the use of teams and scrapers has become general, many contractors appear to think the requirement excessive. It has not been discovered, however, that any difference in the prices bid is made between work done under such a requirement and that done under those which only exact an excess of one-eighth or one-tenth over net measurements as an allowance. Hence, it is thought that nothing could be gained to the public by changing this requirement to conform to the practice which appears to have become pretty general elsewhere. Levees built with scrapers certainly sometimes settle more than one-eighth; and if one-fifth in excess of the net measurements were always required, levees would certainly be somewhat higher, and apparently at no cost to the public.

A few facts connected with levee construction and maintenance, though by no means new, may be mentioned as having been emphasized by the experience of this flood, such as the danger, more than ever apparent this season, that earth added to levees in enlarging them on the land side, may slough and slide down during high water, or whenever it is first thoroughly saturated, even if that condition is delayed for years; and the consequent importance of placing all levee enlargement, except that in form of "banquettes" on the river side wherever practicable; the importance and value of good drainage as a means to prevent sloughing, and to dislodge, or at least discourage, the depredations of burrowing animals; and the fact that to stop leakage, or excessive seepage, in fact, for almost any other purpose with which earth is added to levees—one spadeful of earth put on the water side of the levee, is worth dozens placed on the land side.

The only recommendations I can make at this time are that gaps in the line be closed and the work of enlarging the levees throughout the alluvial valley to higher grades and stronger sections be carried on as rapidly as means therefor can be made available; and that in the interests of Louisiana, the lines be extended up Amos Bayou in Arkansas, down the Mississippi, left bank, below Bohemia, and especially down the right bank below Bougere Landing.

Very respectfully,

HENRY B. RICHARDSON,

Chief State Engineer.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., August 22, 1896.

To the President and Members of the Mississippi River Commission, Army Building, New York, N. Y.:

GENTLEMEN—The Board of State Engineers proposes recommending to the Boards of Commissioners for the State Levee Districts in the lower part of Louisiana, that the construction and enlargement of levees along the Mississippi River, below the head of Bayou Lafourche, be carried on as rapidly as the means available will permit, and that the top of the levees be fixed as nearly as practicable at a grade line (referred to the highest stages of water in the river thus far recorded), as follows:

MILES BELOW CAIRO.		ELEVATION OF GRADE ABOVE HIGH WATER.	MILES BELOW CAIRO.		ELEVATION OF GRADE ABOVE HIGH WATER.
FROM	TO	FEET.	FROM	TO	FEET.
885	892	5.0	964	973	3.9
892	899	4.9	973	982	3.8
899	906	4.8	982	991	3.7
906	913	4.7	991	1,000	3.6
913	920	4.6	1,000	1,009	3 5
920	927	4.5	1,009	1,018	3.4
927	934	4.4	1,018	1,027	3.3
934	941	4.3	1,027	1,036	3.2
941	948	4.2	1,036	1,045	3.1
948	955	4.1	1,045	and Below	3.0
955	964	4.0	......	......	....

The reasons for adopting this grade are: (1) That there seems to be a reasonable prospect that it may give a margin of one or two feet above any future flood heights now considered probable; (2) that it appears practicable to obtain such grades with the means which should become available within a few years to come, and (3) especially that this grade is understood to be identical with that described or recommended in a report by your Committee on Levees.

Above the head of Bayou Lafourche it does not seem practicable at this time to undertake the construction or enlargement of levees, in any general way, to grades higher than five (5) feet above the highest water recorded.

For the sake of formality, it is respectfully suggested that the levee work of the United States in the "Pontchartrain," "Lafourche," "Barataria" and "Lake Borgne" Districts, be made, as far as practicable with the means available, to conform to the grade above described.

Very respectfully, etc.,
THE BOARD OF STATE ENGINEERS,
Per HENRY B. RICHARDSON,
Chief State Engineer.

STATEMENT RELATIVE TO EARTHWORK REQUIRED
INFORMATION OF MISSISSIPPI

Approximate cubic yards required to place existing levee line on
than 3 feet above the highwater mark of 1897, with a crown of 8 feet
necessary, to cover crevasses or threatened caves, and also to build

CHARACTER OF WORK	Middle Tensas District	Lower Tensas District	Atchafalaya Basin District
New Levee	1,356,000	850,000	1,500,000
Raising and Enlarging	3,343,000	3,540 000	3,600,000
Banquettes	600,000	2,000,000	2,000,000
Extension of System		2,500,000	
Totals for Districts	5,299,000	8,890,000	7,100,000
Length of Levee Line	85 miles Right Bank	159 miles Right Bank	128 miles Right Bank
Miles Below Cairo	520 to 607	607 to 764	764 to 886

FOR IMPROVEMENT OF LEVEES PREPARED FOR RIVER COMMISSION.

State of Louisiana,
Office Board of State Engineers,
New Orleans, June 18, 1897.

the Mississippi River in the State of Louisiana to a grade of not less and side slopes of 3 to 1 on each side, and to construct new levees where banquettes where none now exist to within ten (10) feet of grade.

Pontchartrain District	Orleans District	Lake Borgne Basin District	Lafourche Basin District	BARATARIA DIST.		TOTALS
				Lafourche District, (portion.)	Buras District, (portion)	
500,000	275,000	170,000	412,500	355,000	230,000	5,648,500
4,500,000	350,000	1,080,000	1,150,000	541,500	325,000	18,429,500
1,300,000	....	50,000	600,000	60,000	....	6,610,000
....	....	....	....	....	....	2,500,000
6,300,000	625,000	1,300,000	2,162,500	956,500	555,000	33,188,000
127 miles Left Bank	26 miles Right and Left Bank	48 miles Left Bank	75 miles Right Bank	45 miles Right Bank	34 miles Right Bank	727 miles Right and Left Bank
834 to 957	957 to 971	971 to 1019	886 to 958.5	958.5 to 1015.5	1015.5 to 1049	520 to 1049

LETTER RELATIVE TO FUNDS AVAILABLE FOR LEVEE PURPOSES ON RED RIVER, AND ADDITIONAL HEIGHT, SECTION AND EXTENT OF LEVEE LINE REQUIRED IN CERTAIN LOCALITIES.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., June 10, 1896.

Major J. H. Willard, Corps of Engineers,
United States Army, Vicksburg, Miss.:

Dear Sir—Your valued favors of the 6th inst., with enclosures, were duly received.

There is no doubt in my mind that your T. B. M. No. 72 is the B. M. I was fortunate enough to touch upon when running the levels for the Mill Bayou Canal Survey, and I think it very possible that in this way most of the lines run on Bayou des Glaizes, from time to time, by parties from this office, can be referred to Cairo Datum, and I will try, at an early day, to comply with your suggestion in regard to visiting your office and comparing notes.

In regard to the ability of the Bossier and Caddo Levee Districts at this time to combine with the State and United States in undertaking further levee work in the districts, there is, unfortunately, but one answer to make, that to accomplish the work of first necessity both disrticts have strained their resources to such an extent in the last four years that it is absolutely necessary for them, for some time to come, to confine their expenditures to a minimum, in order to avoid irreparably crippling their credit. Even by assessing all the taxes permitted by law, which both Boards have readily and unfortunately done, the resources of the districts are at best very limited. But in spite of this fact the levee work executed by the Bossier and Caddo Levee Boards alone, in the last four years, foots up the creditable aggregate of about 3,000,000 cubic yards, which, with total possible resources within the same period of $600,000.00, including $400,000.00 thirty-year six per cent. bonds, for which $24,000.00 must annually be set aside for interest, readily warrants the claim that the Boards have earned a well merited breathing spell to enable them to devise ways and means to meet the heavy obligations for the liquidation of which they have been compelled to hypothecate the entire revenues of the districts for future years.

The State funds available for levee work in Caddo and Bossier will, this year, probably amount to about the usual sum annually applied in these districts, say $30,000.00.

It is, however, the opinion of this Board that the State funds should not, at this time, be applied in bulk to any one locality, but be held in reserve to keep intact and preserve, as far as possible, the line of public levee as it now exists, much of which is still lower in grade and smaller in section than is believed to be neeessary to insure an equal degree of security to all parts of the district, and many parts of which are more or less threatened by breaches from caving banks.

From which you will readily understand that we could not, at this time, recommend the allotment of any part of the State fund to the work of closing the gap between Red Bayou and Sale and Murphy Canal.

With no further immediate closure of outlets on Red River, the work in the Caddo and Bossier Levee Districts, which the Board of State Engineers believe should next receive consideration, is as follows:

In the Caddo Levee District—Red Bayou Levee, extension up stream; Bayou Pierre to Dixie Levee, enlargement; Dixie Levee, new; Eagle Bend and Kentucky Levees, enlargement; Levy Levee, new; Logie Lea Levee, new; Magnolia Levee, new, and Campo Bello, new. The cubic yards involved in this will approximate 600,000; of this amount we would hope that the State might, this season, undertake about 150,000 cubic yards of the most urgent, provided the prices for levee work which have lately maintained, continue.

In the Bossier Levee District the levee work which should, in our opinion, be next considered, is as follows: Buck Hall, enlargement; Cash Point, enlargement and new levee; Pandora, new levee and enlargement; Jeter's to Dillard's, new levee and enlargement; Lower Sunflower, enlargement; Childer's, new levee; Magenta to Knox Point, enlargement; the cubic yards involved in which will approximate 500,000. As in Caddo, it may be possible, under like conditions, for the State to also do as much as 150,000 cubic yards of the amount thus estimated for the Bossier Levee District.

It will thus be seen that, for some time to come, it will be necessary in the disposition of the funds available for levee purposes to continue to be governed, season by season, by developments and the necessity of providing for the work required in localities for immediate protection, and endeavor to do such work as promises, at the time, to insure the greatest good to the greatest number.

In all this, consideration has so far been given to but two districts on Red River, while a third, the Red River, Atchafalaya and Bayou Bœuf District should certainly not be overlooked, if it be at all possible to render it assistance, for its efforts for protection have been as signal as any in the State. Its levee line on Red River is to-day in a very promising condition, fully eighty per cent. of it having been, within the past four years, improved to a grade three feet above high water, with fairly proportionate cross-sections. The gap at the lower end of the system on Red River, however, at Bayou Choctaw, with which you are perfectly familiar, still remains open to the injury of a large part of the district. It is the earnest wish of all parties concerned that the work necessary to close this gap be recognized as the next most important work required in the district, and this view is endorsed by the Board of State Engineers.

As to applying funds at this time to enlarging the levees in Caddo and Bossier, below, it occurs to us that you may have in mind the possible closure of Tones' Bayou at some early date, Mr. Trezevant having recently, in the course of conversation, said that he believed that you might consider its recommendation if you could ascertain the probable contents of the work, and requesting us to furnish him with an approximate estimate of the same, for which purpose a survey was made, a copy of which was sent you. But while the ultimate closure of this bayou is, undoubtedly, to be desired, we do not believe that it should be undertaken as long as any part of the balance of the levee line on either bank of Red River, as it now exists, remains to any degree uncertain in grade, section or location, so that, unless the closure of Tones' Bayou is seriously contemplated at a very early date, we would not consider the time ripe for applying any considerable sum of money to the general enlargement of the lines in Caddo and Bossier below.

With you the Board of State Engineers recognize that the completion of the levee between the Sale and Murphy Canal, and the upper end of the Red Bayou Levee, is of the very greatest importance to the Caddo Levee District, and if a sufficient amount of money, to push it through at any one time, were available, would consider it a step in the right direction to so undertake it, but such being out of the question, the application annually of a portion of the means available to gradually close this gap, thus permitting a part to be also used in aiding in the accomplishment of the important work needed in other districts, would seem to us the more politic.

And finally, to boil this down, we would say that if you could see your way to applying such money as you may have available for levee work this season, to extending the Red Bayou Levee up stream about two or three miles (200,000 cubic yards, more or less); to the construction of a new levee at Pandora (80,000 cubic yards, more or less); the present line being seriously threatened by caving, and to the closure of Bayou Choctaw, in Avoyelles parish (150,000 cubic yards, more or less), no better disposition could, at this time, be made of that amount of money on Red River, all of which, with what we estimate as possible for the State to also do this season on Red River, would aggregate a very considerable amount of desirable work that would probably be accomplished within the year. In the event of the price for levee work being higher than during the past year, and your means are not sufficient to cover the three localities named, the State might also undertake a portion of the work required at Bayou Choctaw out of such funds as are usually allotted, annually, to the Red River, Atchafalaya and Bayou Bœuf Levee District.

Any further details that you may deem necessary will be gladly and promptly furnished you upon request, as also any surveys that might facilitate in arriving at closer estimates af quantities.

Very respectfully,
THE BOARD OF STATE ENGINEERS,
Per F. M. KERR,
Assistant State Engineer.

LETTER RELATIVE TO CLOSURE OF TONES' BAYOU, AND INCREASE IN HEIGHT, SECTION AND EXTENT OF LEVEE LINES ON RED RIVER, IN THE CADDO AND BOSSIER LEVEE DISTRICTS.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, LA., June 11, 1896.

Major J. H. Willard, Corps of Engineers,
United States Army, Vicksburg, Miss.:

DEAR SIR—Your very interesting letter of the 10th inst., with inclosures, was received this morning.

As you also have a letter of the same date from me by this time, you will see that the survey at Tones' Bayou was not intended for the purpose of recommending or undertaking the closure of the bayou, but simply an accomodation to supply information, and it is, therefore, hardly necessary for me to say much more than that I feel much gratified to find that we agree so thoroughly on the whole subject.

In fact, it would appear that if any difference on the subject exists between us at all, that it lies in my views being the more pronounced of the two in regard to the prematureness of the undertaking. In regard to the grade, however, to which it may be necessary to raise the levee lines in Caddo and Bossier, say from Curtis' to Lovely Point, when the closure of Tones' Bayou is determined, I am disposed to feel that a net grade five (5) feet above the highest water that has so far prevailed in localities will, with intelligent vigilance and care, during critical flood periods, give a good margin of safety above any increase in height that may be expected. As the existing line of levee between the points named (Curtis' and Lovely Point) has, for its greater length, already been built to a net grade of three (3) feet above the highest water, and a very large percentage of the line may be expected to still stand at or very near "gross grade," it follows that to increase the grade to five feet above high water should not involve much more than an average of 1.5 feet new increase in height, or about three cubic yards to the running foot, and, roughly, about 300,000 cubic yards for Bossier and an equal amount for Caddo. Some parts of the line, however, will require to be relocated. notably at Childer's in Bossier, and at Levy's, Logie Lea and Magnolia, in Caddo, which will probably increase the amount named as much as 250,000 cubic yards.

The estimate given for enlarging the levees in Caddo and Bossier, in connection with the survey at Tones' Bayou, shown on the blueprint forwarded to you, comprehended simply the improvement of the line from Shreve's Cut-off to Knox Point. On page 15 of our last report you will see that an estimate of 2,500,000 cubic yards is suggested for further extensions to the system (Red Bayou Levee to Sale & Murphy Canal, and Corner Place to Cuba Place) and to generally improve the grade and section of the line in certain localities in Caddo.

And, again, on page 17, the further needs of Bossier, for similar purposes, are placed at not less than 1,000,000 cubic yards. In fact, I do not think we are very far apart on any subject connected with the work of public improvement on Red River, or that we are likely to be. With regards, I am,

Yours very truly,
THE BOARD OF STATE ENGINEERS,
Per Frank M. Kerr,
Assistant State Engineer.

LETTER TO HON. S. T. BAIRD, M. C., RELATIVE TO "BOUGERE CREVASSE."

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., July 24, 1897.

Hon. S. T. Baird, M. C., House of Representatives, Washington, D.C.:

Dear Sir—Replying to yours of the 17th inst., I respectfully report the following, relative to the unleveed portion of the Mississippi River front of Concordia parish, La., known as the "Bougere Crevasse."

My information is, that for some years previous to the war between the States, the parish of Concordia maintained a line of public levees along the Mississippi River from the upper end of the parish to within about twelve miles of its lower end at the mouth of Red River. During the four years of war, little or nothing was done for the preservation and repair of levees anywhere, so that they were found, when peace was restored in 1865, with many breaches to be closed to make them continuous, and with many portions of the line threatened, by caving banks, with early destruction.

The Bougere Bend, about twenty-five miles above Red River, has always had a caving bank. Sometime in 1866 the caving reached the levee line then existing around the bend, and since that time there has been a gap in the levee line, which was gradually increased in width by the constant caving and recession of the river bank, until at the present time there is no levee left along the bank of the entire bend, from Bougere Landing to Union Front, some four miles and a half, while below Union Point the line has been entirely abandoned as a part of the public levee system.

The effective public levee system of the Mississippi River, on what is known as the "Tensas Front," comes to an end, and has done so for many years, at Bougere Landing, twenty miles above the mouth of Red River. The water of the Mississippi, during floods, is thus allowed to escape from the channel and over the bank almost everywhere below Bougere Landing, so that the unleveed front is often spoken of as a crevasse twenty-five or twenty-six miles wide.

In a number of flood years, when the Tensas Basin has been extensively inundated by water from a crevasse a long way further up the river, there has been for a part of the time a return flow into the river over this unleveed bank, and it is partly for this reason that the authorities in charge of the levee work have left the gap in the line so long unclosed. But the great reason—the real reason—for the present situation, is the great size and cost of the levee necessary to carry the system down to the mouth of Red River (or Old River) where it should go. Recent estimates of the United States Engineers show 2,967,000 cubic yards of earthwork as necessary for the purpose, while an estimate made in this office (with probably slightly different assumptions as to the form of embankment) puts it, in round figures, at 2,500,000 cubic yards. The upper five or six miles of such a levee would be very large, probably averaging twenty feet in height, and a large part of the whole line would be through dense forests, so that the cost would probably be greater than that of ordinary levee work. I should not think it safe to estimate it at less than $550,000.00.

While it is true, as above stated, that in many flood years water has, at times, run back into the river instead of escaping from it through the Bougere Crevasse, it is none the less true that great damage to a large area in the parishes of Concordia and Catahoula, results from the overflow directly due to this gap in the levee system. It has been estimated that over 295,000 acres of land in Concordia parish alone was overflowed during the flood of this year (1897), and that nearly all of the area flooded would have been laid under water by the Bougere Crevasse, even if there had been no break in the levees above. I am without definite figures as to the area overflowed in Catahoula parish, but think it reasonable to place at least as large an estimate upon the land inundated from Bougere Crevasse in that parish. The effect of the large escape of water from the channel of the river through this crevasse, in causing large deposits in its bed, is referred to in a "Report of Capt. Millis, Corps of Engineers, U. S. Army, on surveys in the vicinity of the crevasse," of June 22, 1894, contained in a report of Mississippi River Commission for 1894, Appendix XX, of Report of Chief of Engineers, U. S. Army, p. 3068, which correctly describes the crevasse, except that I think it in error as to the year when the levee was first breached by caving.

Besides the injurious effects of these deposits in contracting the channel, I think there is reason to believe that the water escaping at Bougere tends to make the maintenance of a navigable channel between the Mississippi, Red, and Atchafalaya Rivers more difficult and uncertain than it would be if the levee line were extended down to the mouth of Red River. In the latter case the channel connecting the Mississippi with the Red and Atchafalaya would evidently be narrowed down to a width which might be expected to keep itself deep and open by the scouring of the current, instead of being, as it is now in times of extreme flood, a shallow sheet of water, with variable currents, twenty-five or twenty-six miles wide.

It is, of course, in every way desirable that this great gap in the levee system should be closed; but it is beyond the means of the Fifth Louisiana Levee District, or of the State, to undertake this work; that is, beyond their means to do this, and to do other work that must be done to maintain the levee system we already have. It has also, thus far, proved beyond the means appropriated by Congress for the General Improvement of the Mississippi River, although the earliest advertisements by the U. S. Engineers for levee work, in accordance with the plans of the Mississippi River Commission in 1882, included the Bougere Crevasse Levee (see Appendix R, Report Mississippi River Commission, 1882, pages 236, *et seq.*, 245 and 253), but the available funds were found insufficient, as has been the case ever since.

I, of course, cannot be a good judge of the feasibility of securing a special appropriation for the closure of this crevasse, but I can see no harm to come of trying it, and am beginning to think we shall never get it closed in any other way.

If our office can help you in this, or any other matter, we shall always be at your service.

Very respectfully,
HENRY B. RICHARDSON,
Chief State Engineer.

TABULAR STATEMENTS FURNISHED TO SUB- COMMERCE No. 1.—RELATIVE TO DIMEN

Table of approximate mean dimensions, length and contents of levees
Louisiana, including work now under contract

DISTRICT	Length of Levee Line in Miles	Average height of crest above highwater of 1897.	Highwater of 1897 above highest previous recorded water	Average height of levees	Average width of Crown
		Feet	Feet	Feet	Feet
Fifth Louisiana District	221	2.0	3.5 to 1.2	11.6	8
Atchafalaya Basin District	128	3.0	1.3 to 2.5	13.3	8
Lafourche Basin District	120	2.0	2.2 to 1.0	10.8	6
Pontchartrain District	126	2.0	2.5 to 1.5	11.4	6
Orleans District	26	4.0	1.6	9.3	8
Buras District	34	1.0	1.0 to 0.3	4.3	5
Lake Borgne Basin District	48	2.0	1.6 to 0.3	8.3	6
Left bank below Lake Borgne Basin District	23	0.0	0.3	3.0	2
Totals	726				

NOTE —The total length of public levee line in the State of
Atchafalaya Rivers and on Bayous des Glaizes and Lafourche is
85,000,000 cubic yards. The State of Louisiana also depends for
up the Mississippi River in Cypress Creek and Amos Bayou in Chicot

COMMITTEE OF U. S. SENATE COMMITTEE ON SIONS AND CONTENTS OF LEVEES.

State of Louisiana,
Office Board of State Engineers,
New Orleans, February 17, 1898.

on the Mississippi River in the several levee districts of the State of and expected to be in position by June, 1898.

Average side Slopes		Approximate Contents	REMARKS
Land Side	River Side		
		Cubic Yards	
3 to 1	3 to 1	23,040,752	Levees extend from the Arkansas line to Bougere Landing (26 miles below Bougere practically unleveed), contents given includes about 1,504,618 cubic yards in banquettes.
3 to 1	3 to 1	16,527,682	Levees extend from Barbre's Landing at head of Atchafalaya River to Bayou Lafourche, contents given includes about 194,558 cubic yards in banquettes.
3 to 1	3 to 1	9,732,096	Levees extend from Bayou Lafourche to upper line of Orleans parish and from lower line of Orleans parish to lower line of Riceland plantation.
3 to 1	3 to 1	11,291,797	Levees extend from city limits of Baton Rouge to upper line of Orleans parish.
3 to 1	3 to 1	1,700,000	Levees extend along entire front of Orleans parish, on both sides of the river.
2 to 1	3 to 1	450,000	Levees extend from the lower line of Riceland plantation to the Jump.
3 to 1	3 to 1	2,407,153	Levees extend from lower line of city of New Orleans to lower line of Bohemia plantation.
1½ to 1	1⅓ to 1	87,700	Levees extend from lower line of Bohemia plantation to Fort St. Philip.
		65,237,180	

Louisiana on the Mississippi, Red, Ouachita, Black, Little and estimated at 1,194 miles, containing, as estimated in June, 1897, about protection against overflow upon about 90 miles of levee line extending and Desha Counties, Arkansas.

TABULAR STATEMENTS FURNISHED TO SUB-COMMITTEE OF U. S. SENATE COMMITTEE ON COMMERCE NO. 2, RELATIVE TO AMOUNT AND CONTENTS OF LEVEE WORK SINCE 1865.

STATE OF LOUISIANA,
OFFICE BOARD OF STATE ENGINEERS,
NEW ORLEANS, February 20, 1898.

Statement showing amount and cost of levee work undertaken by the State of Louisiana and its several District Levee Boards, from 1865 to February 1898, condensed from "Appendix C," Report Board of State Engineers of April 20, 1892, with additions from later reports and records of the Board of State Engineers of Louisiana.

PERIODS	Levees on the Mississippi River		Levees on Interior Streams		Totals for all Streams	
	Cubic Yards of Earthwork	Cost	Cubic Yards of Earthwork	Cost	Total cubic yards of Earthwork	Total Cost
1865 to 1879 (a)..	19,674,878	$ 10,133,574 33	1,774,593	$ 1,127,279 22	21,449,471	$ 11,260,853 55
1879 to 1881, both inclusive (b) ..	3,254,110	$ 707,277 08	132,154	$ 34,473 55	3,386,264	$ 741,750 63
1881 to February 1898 (c)........	37,489,815	6,991,928 08	19,103,397	2,941,180 25	56,593,212	$ 9,933,108 33
Aggregate—1879 to February 1898, both inclusive.........	40,743,925	7,699,205 16	19,235,551	$ 2,975,653 80	59,979,476	$ 10,674,858 96
Aggregates for all streams 1865 to Feb'y 20, 1898, (d)....	....	....	....	....	81,428,947	$ 21,935,712 51

NOTES.—(a.) Amount and cost of levee work, 1866 to 1879 cannot be accurately separated as to work done on the Mississippi River and on interior streams, but the records show that only a small proportion of the work was done on interior streams, and the above figures give the best information now available.

(b.) The first work undertaken by the United States on the Mississippi River was in 1882.

(c.) Amount and cost of levee work on Mississippi River and interior streams as above stated, distributed in the several levee districts as follows (1881 to February, 1898):

LEVEE DISTRICTS	Levees on the Mississippi River		Levees on Interior Streams		Totals for all Streams	
	Cubic Yards of Earthwork	Cost	Cubic Yards of Earthwork	Cost	Total Cubic Yards of Earthwork	Total Cost
Tensas Basin...	2,011,525	$443,951 29	86,499	$16,686 55	2,098,024	$460,640 84
Fifth Louisiana.	13,774,463	2,553,075 07	....	....	13,774,463	2,553,075 07
Atchafalaya Basin........	7,980,712	1,444,770 48	4,672,502	718,055 64	12,653,214	2,162,826 12
LafourcheBasin and Buras	5,813,511	997,118 41	3,609,069	486,919 45	9,422,580	1,484,037 86
Pontchartrain Basin & Lake Borgne........	6,559,187	1,270,092 08	....	....	6,559,187	1,270,092 08
Orleans.	1,350,417	282,917 75	469,610	135,079 17	1,820,027	417,996 92
Caddo.	....	....	3,323,522	516,467 07	3,323,522	516,467 07
Bossier..........	....	....	2,566,834	370,743 34	2,566,834	370,743 34
Red River, Atchafalaya and Bayou Bœuf..	....	....	4,375,361	697,229 03	4,375,361	697,229 03
Totals.....	37,489,815	$6,991,928 08	19,103,397	$2,941,180 25	56,593,212	$9,933 108 33

(d.) The above items are exclusive of the large and mostly unrecorded amount of work done on the public levees in Louisiana (the greater part previous to the organization of the levee districts) by parochial and municipal authorities, by corporations and private parties; and do not include any expenses of administration, nor discount or interest paid by the several levee districts on bonds or other debts. They are also exclusive of the most of the wooden revetments and other protective works, and of all "high water expenses," such as sacks, lumber, freight, guards, laborers, etc.

TABULAR STATEMENTS FURNISHED TO SUB-
COMMERCE. No. 3, RELATIVE TO

Resources of the State of Louisiana and the several Levee Districts gross amounts of taxes and local assessments, based upon returns

From the State at large, (i. e., the General Engineer Fund) distributed under Act 102, of 1892, as follows:		LAWS	Amendments	BONDS Amount Authorized.)	 Amount issued to date. (N. O. Stock Ex.
Orleans Levee District	$ 10,000 00	No. 33 of '79	(Note) (1)	....	....
Tensas Basin Levee District (10%)	20,359 82				
Caddo Sub-District (9½%)	19,341 83				
Natchitoches Sub-District, (3½%)	7,125 94				
Other Levee Districts, (77%)	156,770 62				
Appropriations, (Act 26, of 1896).	46,200 00				
REGULAR LEVEE DISTS.					
Tensas Basin		No. 26 of '84	(2)	$150,000	$149,000
Fifth Louisiana		No. 44 of '86	(3)	500,000	420,000
Atchafalaya Basin		No. 97 of '90	....	1,000,000	800,000
Lafourche Basin		No. 13 of '92	(4)	500,000	250,000
Buras		No. 18 of '94	....	10,000	....
Cat Island		No. 110 of '94	....	100,000	....
Pontchartrain		No. 95 of '90	(5)	1,000,000	708,500
Orleans		No. 93 of '90	(6)	(None)	....
Lake Borgne		No. 14 of '92	....	100,000	100,000
Caddo		No. 74 of '92	(7)	200,000	199,800
Bossier		No. 89 of '92	(8)	200,000	199 100
Red River, Atchafalaya and Bayou Bœuf		No 79 of '90	(9)	250,000	250,000
				$4,010,000	$3,076,400

NOTE.—Amendments to Laws: (1) Acts 73, of 1882, 83, of 1884, 60, of 1890, 4, of 1892, and 48, of 1894; (4) 100, of 1892, and 19 and 175, of 1894; (9) 46 of 1892.

(+) No acreage assessments made in 1897. (×) No railroad

COMMITTEE OF U. S. SENATE COMMITTEE ON RESOURCES FOR LEVEE PURPOSES.

STATE OF LOUISIANA,
Office Board of State Engineers,
New Orleans, La., February 28, 1898.

of the State, for levee purposes, under existing laws, with estimated for 1897.

MILL TAX		ACREAGE, RAILROAD AND PRODUCE ASSESSMENTS				
Rate permitted, Mills	Gross Amount (State Auditor.)	Rate permitted, cents per acre.	Rate permitted, $ per mile.	Gross Amount Acreage and Railroad Assessments (State Auditor.)	Produce Assessment Collected in 1897 (State Auditor.)	GROSS ANNUAL REVENUES
1	$ 259,798 21	....	....	....	....	$259,798 21
10	11,559 85	5	30 to 100	(+) 3,792 75	(None Auth'd)	15,352 60
10	49,526 63	5	20, 30, and 60	(×)51,070 22	$37.704 60	138,301 45
10	127,217 88	2½	60	48,175 60	58,768 94	235,162 42
10	86,027 82	2½	50 100	26,089 08	36,110 49	148,227 39
10	4,342 95	5	50	1,060 15	767 42	6,170 52
10	(None Ass'ed)	2½	100	(None Ass'ed)	(None Ass'ed)	....
10	47,598 05	3	100	20,237 78	21,666 09	89,501 92
1	140,822 64	(No	ne)	(None Auth'd)	(None Auth'd)	140,822 64
10	17,654 90	5	60	4,199 05	535 79	22,389 74
10	6,456 80	5	60	(*) 5,383 50	6,173 80	18,014 10
10	9,393 15	5	60	(*) 5,960 25	12,089 99	27,443 39
10	30,397 10	5	60	22,631 45	(None Auth'd)	53,028 55
	$790,795 98			$ 188,599 83	$174.817 12	$ 1,154,212 93

1886, and 102, of 1892; (2) 59, of 1886, 77, of 1888, and 70, of 1894; (3) 16, of
(5) 68, of 1892, and 59, of 1894; (6) 79, of 1892; (7) 90, of 1894; (8) 104, of 1894;

assessment made in 1897. (*) No railroad assessment returned.

APPENDIX D.

High Water Records, from 1872 to 1897, inclusive.

HIGH WATER RECORD—1872.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	April 13	41.75	468.11	Miss. Riv. Com'n.
Louisville, upp'r gauge	April 14	20.95	419.45	Miss. Riv. Com'n.
St. Paul	May 19 to 22	7.70	680.70	Weather Bureau..
Davenport	May 28	9.60	543.36	Weather Bureau..
St. Louis	June 12-13	21.90	400.87	Miss. Riv. Com'n.
Cairo	April 19-20	39.20	308.78	Miss. Riv. Com'n.
Memphis	April 24	31.50	214.21	Miss. Riv. Com'n.
Helena	April 26	39.03	179.75	Miss. Riv. Com'n.
Mouth White River	April 30 to May 1	40.20	147.67	Miss. Riv. Com'n.
Little Rock	May 20-21	26.00	246.29	Miss. Riv. Com'n.
Lake Providence	May 1	35.15	103.51	Miss. Riv. Com'n.
Vicksburg	May 2-3	39.50	84.28	Miss. Riv. Com'n.
Natchez	May 4-5	39.85	55.48	Miss. Riv. Com'n.
Alexandria	April 29 to May 1	33.30	76.50	Miss. Riv. Com'n.
Red River Landing	May 6	39.42	42.01	Miss. Riv. Com'n.
Baton Rouge	May 7	29.65	28.45	Miss. Riv. Com'n.
Carrollton	May 6	12.30	11.95	Miss. Riv. Com'n.

HIGH WATER RECORD—1873.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 21	41.50	467.86	Miss. Riv. Com'n.
	December 19	44.42	470.78	Miss. Riv. Com'n.
Louisville, upper gauge	February 21	17.10	415.60	Miss. Riv. Com'n.
	December 19	18.30	416.80	Miss. Riv. Com'n.
St. Paul	April 21	16.40	689.40	Weather Bureau..
Davenport	May 8	12.90	546.66	Weather Bureau..
Kansas City	July 5	19.30	736.00	Weather Bureau..
St. Louis	April 11	24.25	403.22	Miss. Riv. Com'n.
	June 10	24 15	403.12	Miss. Riv. Com'n.
Memphis	April 17	31.85	214.56	Miss. Riv. Com'n.
Helena	March 6	40.00	180.72	Miss. Riv Com'n.
	April 20 to 22	39.70	180.42	Miss. Riv. Com'n.
Mouth White River	March 9	41.95	149.42	Miss. Riv. Com'n.
	April 25-26	42.90	150.37	Miss. Riv. Com'n.
Little Rock	April 12	22.60	242.89	Miss. Riv. Com'n.
Lake Providence	May 28	36.12	104.48	Miss. Riv. Com'n.
Vicksburg	May 29	40.60	85.38	Miss. Riv. Com'n.
Natchez	March 12-13	39.00	54.63	Miss. Riv. Com'n.
	May 30	40.15	55.78	Miss. Riv. Com'n.
Alexandria	June 19-20	30.20	73.40	Miss. Riv. Com'n.
Red River Landing.	March 11 to 17	36.86	39.45	Miss. Riv. Com'n.
	June 12	39.02	41.61	Miss. Riv. Com'n.
Baton Rouge	March 16	28.32	27.12	Miss. Riv. Com'n.
	June 1 to 4	29.80	28.60	Miss. Riv. Com'n.
	June 17	29.85	28.65	Miss. Riv. Com'n.
Carrollton	May 6	12.68	12.33	Miss. Riv. Com'n.
	June 3-4	12.93	12.58	Miss. Riv. Com'n.

HIGH WATER RECORD—1874.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	January 13	46.75	473.11	Miss. Riv. Com'n.
	May 2	46.00	472.36	Miss. Riv. Com'n.
Louisville, upper gauge	January 13	22.22	420.72	Miss. Riv. Com'n.
	February 26	22.35	420.85	Miss. Riv. Com'n.
	May 3	22.00	420.50	Miss. Riv. Com'n.
Nashville	April 17	49.60	....	Miss. Riv. Com'n.
Chattanooga	May 1	29.58	660.22	Miss. Riv. Com'n.
St. Paul	July 2	11.60	684.60	Weather Bureau..
Davenport	March 9	15.60	549.36	Weather Bureau..
Kansas City	June 17 to 19	16.20	....	Weather Bureau..
St. Louis	April 2	17.75	396.72	Miss. Riv. Com'n.
	June 19-20	18.40	397.37	Miss. Riv. Com'n.
Cairo	April 26	47.37	316.95	Miss. Riv. Com'n.
Memphis	May 2	34.00	216.71	Miss. Riv. Com'n.
Helena	May 11	45.82	186.52	Miss. Riv. Com'n.
Little Rock	April 25	23.00	243.29	Miss. Riv. Com'n.
Lake Providence	March 21 to 23	37.37	105.73	Miss. Riv. Com'n.
	April 29 to May 1	37.08	105.44	Miss. Riv. Com'n.
Vicksburg	May 2 to 5	45.70	90.48	Miss. Riv. Com'n.
Natchez	April 20	45.60	61.23	Miss. Riv. Com'n.
Alexandria	May 8 to 10	34.90	78.10	Miss. Riv. Com'n.
Red River Landing	April 16	47.00	49.59	Miss. Riv. Com'n.
Baton Rouge	April 16	36.15	34.95	Miss. Riv. Com'n.
Carrollton	April 15	15.95	15.60	Miss. Riv Com'n.

HIGH WATER RECORD—1875.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	March 2	42.58	468.94	Miss. Riv. Com'n.
	August 6	55.33	481.69	Miss. Riv. Com'n.
Louisville, upper gauge	March 3	19.50	417.50	Miss. Riv. Com'n.
	August 7	30.30	428.80	Miss. Riv. Com'n.
Nashville	March 2	41.50	....	Miss. Riv Com'n.
Chattanooga	March 1	54.00	684.64	Miss. Riv. Com'n.
St. Paul	April 16	18.00	691.00	Weather Bureau.
Davenport	April 29	12.90	546.66	Weather Bureau.
Omaha	April 27-28	17.80	976.51	Weather Bureau.
Kansas City	April 30	17.80	734.50	Weather Bureau.
St. Louis	May 3	24.60	403.57	Miss. Riv. Com'n.
	August 3	29.80	408.77	Miss. Riv. Com'n.
	July 11-12	28.75	407.72	Miss. Riv. Com'n.
Cairo	March 21	43.66	313.24	Miss. Riv. Com'n.
	August 8	45.12	314.70	Miss. Riv. Com'n.
Memphis	March 29	32.85	215.56	Miss. Riv. Com'n.
	August 15 to 17	33.05	215.76	Miss Riv. Com'n.
Helena	April 12 to 14	42.40	183.12	Miss. Riv. Com'n.
Mouth White River	April 16 to 17	45.00	152.47	Miss. Riv. Com'n.
Little Rock	May 5	21.0	241.29	Miss. Riv. Com'n.
	August 5	21.8	242.09	Miss. Riv. Com'n.
Lake Providence	April 19-20	37.29	105.65	Miss. Riv. Com'n.
Vicksburg	April 21	43.00	87.78	Miss. Riv. Com'n.
Natchez	April 25-26	41.85	57.44	Miss. Riv. Com'n.
Alexandria	April 27	23.90	67.10	Miss. Riv. Com'n.
Red River Landing	May 3	40.45	43.04	Miss. Riv. Com'n.
Baton Rouge	May 13	29.75	28.55	Miss. Riv. Com'n.
Carrollton	May 2 to 5	11.30	10.95	Miss. Riv. Com'n.
	May 14 to 18	11.30	10.95	Miss. Riv. Com'n.

HIGH WATER RECORD—1876.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	January 29	51.75	478.11	Miss Riv. Com'n.
Louisville, upp'r gauge	January 30	32.50	431.00	Miss. Riv. Com'n.
Nashville	January 29	34.40	....	Miss. Riv. Com'n.
	February 29	32.10	....	Miss. Riv. Com'n.
Chattanooga	February 17	21.92	652.36	Miss. Riv. Com'n.
St. Paul	April 10	11.00	684.00	Weather Bureau.
Davenport	April 17-18	13.50	547.26	Weather Bureau.
Omaha	July 4	14.60	973.31	Weather Bureau.
Kansas City	June 16	18.00	734.70	Weather Bureau.
St. Louis	May 10	32.00	410.97	Miss. Riv. Com'n.
Cairo	April 6-7	46.38	315.96	Miss. Riv Com'n.
Memphis	April 8-9	34.08	216.79	Miss. Riv. Com'n.
Helena	April 18-19	44.85	181.57	Miss. Riv. Com'n.
Mouth White River	April 8 to 15	46.70	154.17	Miss. Riv. Com'n.
Little Rock	April 5	23.10	243.39	Miss. Riv. Com'n.
	July 7	26.30	246.59	Miss. Riv. Com'n.
Lake Providence	April 12 to 14	37.95	106.31	Miss. Riv. Com'n.
Vicksburg	May 10	44.90	89.68	Miss. Riv. Com'n.
Natchez	May 15-16	43.85	59.48	Miss. Riv. Com'n.
Alexandria	April 17	32.80	76.00	Miss Riv. Com'n.
Red River Landing	May 15	45.41	48.00	Miss. Riv. Com'n.
Baton Rouge	May 8 to 16	33.40	32.20	Miss. Riv. Com'n.
Carrollton	May 11	12.70	12.35	Miss. Riv. Com'n.

HIGH WATER RECORD—1877.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	January 20-21	53.25	479.61	Miss. Riv. Com'n.
Louisville, upp'r gauge	January 21-22	29.90	428.40	Miss. Riv. Com'n.
Nashville	January 22	40.50	....	Miss. Riv. Com'n.
	April 12	34.80	....	Miss. Riv. Com'n.
Chattanooga	April 11	28.67	659.31	Miss Riv. Com'n.
St. Paul	May 25-26	7.70	680.70	Weather Bureau.
Davenport	April 4-5	9.90	543.66	Weather Bureau.
Omaha	June 13	17.40	976.11	Weather Bureau.
Kansas City	June 10	22.20	738.90	Weather Bureau.
St. Louis	June 14	26.60	405.57	Miss. Riv. Com'n.
Cairo	April 15	40.52	310.10	Miss. Riv. Com'n.
Memphis	April 29	32.05	214.76	Miss. Riv. Com'n.
Helena	April 30 to May 1	41.80	182.50	Miss. Riv. Com'n.
Mouth White River	May 6	44.60	152.07	Miss. Riv. Com'n.
Little Rock	June 13	27.50	247.79	Miss. Riv. Com'n.
Lake Providence	May 6-7	35.82	104.18	Miss. Riv. Com'n.
Vicksburg	May 8 to 13	41.60	86 38	Miss. Riv. Com'n.
Natchez	May 30-31	40.70	56.33	Miss. Riv. Com'n.
Alexandria	May 18-19	25.45	68.65	Miss. Riv. Com'n.
Red River Landing	June 1 to 3	40.55	43.14	Miss. Riv. Com'n.
Baton Rouge	June 1	29.65	28.45	Miss. Riv. Com'n.
Carrollton	June 4 and 8	11.10	10.75	Mlss. Riv. Com'n.

HIGH WATER RECORD—1878.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	March 17	33.33	459.69	Miss. Riv. Com'n.
	December 1	38.00	464.36	Miss. Riv. Com'n.
Louisville, upper gauge	March 18	12.10	410.60	Miss. Riv. Com'n.
	December 17	15.50	414.00	Miss. Riv. Com'n.
Nashville	April 26	27.30	....	Miss. Riv. Com'n.
Chattanooga	February 25	19.17	649.81	Miss. Riv. Com'n.
St. Paul	March 17-18	6.40	679.40	Weather Bureau.
Davenport	May 9	7.10	540.86	Weather Bureau.
	July 17	7.20	540.96	Weather Bureau.
Omaha	June 25-26	17.80	976.51	Weather Bureau.
Kansas City	July 2-3	19.80	736.50	Weather Bureau.
St. Louis	June 15	25.75	404.72	Miss. Riv. Com'n.
Cairo	April 29	37.04	306.62	Miss. Riv. Com'n.
Fulton	April 29	37.04	244.33	Miss. Riv. Com'n.
Memphis	May 2	29.10	211.81	Miss. Riv. Com'n.
Helena	May 3-4	38.75	171.47	Miss. Riv. Com'n.
Little Rock	May 28	24.30	244.59	Miss. Riv. Com'n.
Lake Providence	March 22 to 24	35.80	104.16	Miss. Riv. Com'n.
Vicksburg	March 24 to 27	40.95	85.73	Miss. Riv. Com'n.
	May 10	40.75	85.53	Miss. Riv. Com'n.
Natchez	March 28	39.20	54.83	Miss. Riv. Com'n.
Alexandria	July 1	23.20	66.40	Miss. Riv. Com'n.
Baton Rouge	May 19	29.35	28.15	Miss. Riv. Com'n.
Carrollton	March 21	11.30	10.95	Miss. Riv. Com'n.
	May 16-20	11.20	10.85	Miss. Riv. Com'n.

HIGH WATER RECORD—1879.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 2	40.17	466 53	Miss. Riv. Com'n.
	December 27	42.75	469.11	Miss. Riv. Com'n.
Louisville, upper gauge	January 18	17.70	416.50	Miss. Riv. Com'n.
	December 28-29	19.60	418.10	Miss. Riv. Com'n.
Nashville	January 19	41.60	....	Miss. Riv. Com'n.
Chattanooga	January 15	38.00	668 64	Miss. Riv. Com'n.
St. Paul	July 11	10.80	683.80	Weather Bureau.
Davenport	May 31 to June 3	7.80	541.56	Weather Bureau.
Omaha	April 9	17.00	975.71	Weather Bureau.
Kansas City	June 30	19.20	735.90	Weather Bureau.
St. Louis	April 13	17.80	396.77	Miss. Riv. Com'n.
	July 3	21.15	400.12	Miss. Riv. Com'n.
Cairo	January 26	36.00	305.58	Miss. Riv. Com'n.
Memphis	January 29	28.10	210.81	Miss. Riv. Com'n.
	Mar. 30 to April 1	24.40	207.11	Miss. Riv. Com'n.
Helena	January 31	37.25	177.97	Miss. Riv. Com'n.
	April 2	33.70	174.42	Miss. Riv. Com'n.
Mouth White River	April 11-12	36.20	143.67	Miss. Riv. Com'n.
Fort Smith	May 7	10.8	385.05	Weather Bureau.
Little Rock	February 3	16.60	236.89	Miss. Riv. Com'n.
	May 9	12.00	232.29	Miss. Riv. Com'n.
Lake Providence	February 14 to 16	36.00	104.36	Miss. Riv. Com'n.
	April	32.07	100.43	Miss. Riv. Com'n.
Vicksburg	February 17	39.45	84.23	Miss. Riv. Com'n.
	April 14-15	35.30	80.08	Miss. Riv. Com'n.
Natchez	February 17 to 20.	36.80	52.45	Miss. Riv. Com'n.
Alexandria	May 26	19.20	62.40	Miss. Riv. Com'n.
Red River Landing	February 19-20	35.90	38.49	Miss. Riv. Com'n
Baton Rouge	February 14 to 17.	26.10	24.90	Miss. Riv. Com'n.
Carrollton	February 20-22	10.80	10.45	Miss. Riv. Com'n.

HIGH WATER RECORD—1880.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 17	53.17	479.53	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 19	30.00	428.50	Miss Riv. Com'n.
Nashville.	March 20	46.50	....	Miss. Riv. Com'n.
Chattanooga	March 18	38.33	668.97	Miss. Riv. Com'n.
St. Paul	June 17-18	15.20	688.20	Weather Bureau..
Davenport	June 26	18.40	552.16	Weather Bureau..
Omaha	July 9	17.10	975.81	Weather Bureau..
Kansas City	July 10 to 12	16.70	733.40	Weather Bureau..
St. Louis	July 12	25.50	404.47	Miss. Riv. Com'n.
Cairo	March 22	44.60	314.18	Miss. Riv. Com'n.
Fulton	March 26	34.15	241.44	Miss Riv. Com'n.
Memphis	March 24 to 29	33.40	216.11	Miss. Riv. Com'n.
Helena	March 31	43.70	184.4	Miss Riv. Com'n.
Mouth White River	March 23 to 25	46.55	154.02	Miss. Riv. Com'n.
Fort Smith	March 8	10.50	384.75	Weather Bureau..
Little Rock	March 15	14.80	235.09	Miss. Riv. Com'n.
Arkansas City	March 21 to 26.	45.10	140.28	Miss Riv. Com'n.
Lake Providence	April 3	38.05	106.40	Miss. Riv. Com'n.
Vicksburg	April 8-9	43.15	87.93	Miss. Riv. Com'n.
Natchez	April 16	43.50	59.13	Miss. Riv Com'n.
Alexandria	April 11 to 13	21.80	65.00	Miss. Riv. Com'n.
Red River Landing	April 22 to 24	44.05	46.64	Miss. Riv. Com'n.
Baton Rouge	April 22 to 24	33.20	32.00	Miss Riv. Com'n.
Plaquemine	April 23 to 25	29.00	28.80	Miss. Riv. Com'n.
College Point	April 20 to 22	21.30	21.25	Miss. Riv. Com'n.
Carrollton.	April 23-24	14.25	13.90	Miss Riv. Com'n.

HIGH WATER RECORD—1881.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 16	50 50	476.86	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 17	22.50	421.00	Miss. Riv. Com'n.
Nashville	January 25	33.00	....	Miss. Riv. Com'n.
	April 16	31.80	....	Miss. Riv. Com'n.
Chattanooga	February 13	22.42	653.06	Miss. Riv. Com'n.
St. Paul	April 29	19.50	692.50	Weather Bureau.
Davenport	October 25 to 27	17.70	551.46	Weather Bureau.
Omaha	April 24-25	23.80	982.51	Weather Bureau.
Kansas City	April 30	26.30	743.00	Weather Bureau.
St. Louis	May 6	33.65	412.62	Miss. Riv. Com'n.
Cairo	April 21	45.60	315.18	Miss. Riv. Com'n.
Fulton	April 26	34.27	241.56	Miss. Riv. Com'n.
Memphis	March 2-3	31.70	214.41	Miss. Riv. Com'n.
	April 27-28	33.30	216.01	Miss. Riv. Com'n.
Helena	March 4 and 15	41.65	182.37	Miss. Riv. Com'n.
	May 14	43.74	184.46	Miss. Riv. Com'n.
Mouth White River	March 7 to 9	45.10	152.57	Miss. Riv. Com'n.
	May 15 to 18	45.70	153.17	Miss. Riv. Com'n.
Fort Smith	May 25	15 80	390.05	Weather Bureau.
Little Rock	February 20	18.40	238.69	Miss. Riv. Com'n.
Lake Providence	March 11	36.17	104.53	Miss. Riv. Com'n.
	May 10	35.90	104.26	Miss. Riv. Com'n.
Vicksburg	March 10	41.85	86.63	Miss. Riv. Com'n.
	May 10	41.62	86.40	Miss. Riv. Com'n.
St. Joseph	March 13	39.20	70.66	Miss. Riv. Com'n.
Natchez	March 16	40.80	56.43	Miss. Riv. Com'n.
Alexandria	March 20	27.85	71.05	Miss. Riv. Com'n.
Bayou Sara	April 6 to 9	40.10	42.79	Miss. Riv. Com'n.
Baton Rouge	April 8	30.05	28.85	Miss. Riv. Com'n.
	June 2 to 4	29.90	28.70	Miss. Riv. Com'n.
College Point	April 7 to 10	19.35	19.33	Miss. Riv. Com'n.
	June 2 to 7	19.10	19.08	Miss. Riv. Com'n.
	May 22 to 24	19.47	19.45	Miss. Riv. Com'n.
Carrollton	March 14 to 16	12.50	12.15	Miss. Riv. Com'n.
	April 12	12.55	12.20	Miss. Riv. Com'n.
	May 26 and 30	12.40	12.05	Miss. Riv. Com'n.

HIGH WATER RECORD—1882.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 21	58.58	484.94	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 22	37.40	435.90	Miss. Riv. Com'n.
Nashville	January 22	55.10	....	Weather Bureau.
	March 13	46.10	....	Weather Bureau.
Chattanooga	January 19	40.17	670.81	Miss. Riv. Com'n.
St. Paul	April 13	13.30	686.30	Weather Bureau.
Davenport	April 23	14.10	547.86	Weather Bureau.
Omaha	June 28-29	14.50	973.21	Weather Bureau.
Kansas City	July 3	19.20	735.90	Weather Bureau.
St. Louis	July 5-6	32.20	411.17	Miss. Riv. Com'n.
Cairo	February 26	51.87	321.45	Miss. Riv. Com'n.
Fulton	March 1	36.69	243.98	Miss. Riv. Com'n.
Memphis	March 6-9	35.15	217.86	Miss. Riv. Com'n.
Helena	March 9	47.20	187.92	Miss. Riv. Com'n.
Mouth White River	February 28	48.40	155.87	Miss Riv. Com'n.
Fort Smith	February 23	21.80	396.05	Weather Bureau.
Little Rock	February 25	25.70	245.99	Miss. Riv. Com'n.
	May 12	24.70	244.99	Miss. Riv. Com'n.
Arkansas City	February 28	47.00	142.18	Miss. Riv. Com'n.
Greenville	February 27	41.68	128.42	Miss. Riv. Com'n.
	March 17	41.44	128.18	Miss. Riv. Com'n.
Lake Providence	March 20	38.32	106.68	Miss. Riv. Com'n.
Vicksburg	March 20-21	48.75	93.53	Miss. Riv. Com'n.
St. Joseph	March 20	44.90	76.36	Miss. Riv. Com'n.
Natchez	March 28-29	47.75	63.38	Miss. Riv. Com'n.
Alexandria	March 17 to 19	34.85	78.05	Miss. Riv. Com'n.
Red River Landing	March 27	48.50	51.09	Miss Riv. Com'n.
Baton Rouge	March 26	35.95	34.75	Miss. Riv. Com'n.
Plaquemine	March 21 to 27	31.30	31.00	Miss. Riv. Com'n.
College Point	March 22 to 26	23.13	23.11	Miss. Riv. Com'n.
Carrollton	March 20	14.90	14.55	Miss. Riv. Com'n.
	March 27	14.95	14.60	Miss. Riv. Com'n.

HIGH WATER RECORD—1883.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 15	66.33	492.69	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 16	43.80	442.30	Miss. Riv. Com'n.
Nashville	February 14	41.60	....	Weather Bureau.
Chattanooga	January 23	38.17	668.81	Miss Riv. Com'n.
St. Paul	April 22	12.50	685.50	Weather Bureau.
Davenport	May 1-2	13.20	546.96	Weather Bureau.
Omaha	July 8	15.20	973.91	Weather Bureau.
Kansas City	June 26	23.80	740.50	Weather Bureau.
St. Louis	February 26	26.25	405.22	Miss. Riv. Com'n.
	May 23	26.50	405.47	Miss. Riv. Com'n.
	June 26	34.80	413.77	Miss. Riv. Com'n.
Cairo	February 27	52.17	321.75	Miss. Riv. Com'n.
Fulton	March 2	36.29	243.58	Miss Riv Com'n.
Memphis	March 6 to 8	34.75	217.46	Miss. Riv. Com'n.
Helena	March 8-9	46.90	187.62	Miss. Riv. Com'n.
Mouth White River	March 9 to 12	48.00	155.47	Miss. Riv. Com'n.
Fort Smith	February 17	21.80	396.05	Weather Bureau.
Little Rock	February 19	25.80	246.09	Miss. Riv. Com'n.
	June 14	25.40	245.69	Miss. Riv. Com'n.
Arkansas City	March 11	46.32	141.50	Miss. Riv. Com'n.
Greenville	March 10	40.40	127.14	Miss Riv Com'n.
Lake Providence	March 11 to 14	36.47	104.85	Miss. Riv. Com'n.
Vicksburg	April 7	43.80	88.58	Miss. Riv. Com'n.
St. Joseph	April 7	41.90	73.36	Miss. Riv. Com'n.
Natchez	April 7 to 9	44.00	59.63	Miss. Riv. Com'n.
Alexandria	March 20	25.40	68.60	Miss. Riv. Com'n.
Red River Landing	April 9	45.20	47.79	Miss. Riv. Com'n.
Baton Rouge	April 9	35.08	33.88	Miss. Riv. Com'n.
Plaquemine	April 9	30.73	30.53	Miss. Riv. Com'n.
College Point	April 9	23.40	23.38	Miss. Riv. Com'n.
Carrollton	April 7	15.40	15.05	Miss. Riv. Com'n.

HIGH WATER RECORD—1884.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati.........	February 14.........	71.06	497.42	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 16.........	46.60	445.10	Miss. Riv. Com'n.
Nashville.	March 15.............	48.30	....	Weather Bureau.
Chattanooga..............	March 10.............	42.83	673.47	Miss. Riv. Com'n.
St. Paul......	May 5 to 7...........	10.20	683.20	Weather Bureau.
Davenport...............	March 28-29.........	11.90	545.66	Weather Bureau.
	October 18-19.......	11.30	545.06	Weather Bureau.
Omaha.......................	March 24.............	15.50	974.21	Weather Bureau.
Kansas City	July 5 to 7...........	17.20	733.90	Weather Bureau.
St. Louis....................	April 9-10.............	28.10	407.07	Miss. Riv. Com'n.
Cairo..........................	February 22 to 24.	51.79	321.37	Miss. Riv. Com'n.
Fulton........................	February 25 to 29.	35.68	242.97	Miss. Riv. Com'n.
Memphis....................	March 1-3...........	34.15	216.86	Miss. Riv. Com'n.
Helena........................	March 6...............	47.00	188.42	Miss. Riv. Com'n.
Mouth White River...	March 7-8............	47.90	155.37	Miss. Riv. Com'n.
Fort Smith.................	February 14.........	27.90	402.15	Weather Bureau.
Little Rock.................	February 15.........	30.60	250.89	Miss. Riv. Com'n.
Arkansas City............	March 7 to 9........	46.50	141.68	Miss. Riv. Com'n.
Greenville..................	March 8...............	41.10	127.84	Miss. Riv. Com'n.
Lake Providence........	March 23-24.........	38.40	106.76	Miss. Riv. Com'n.
Vicksburg..................	March 25.............	49.00	93.78	Miss. Riv. Com'n.
St. Joseph........	March 24.............	44.89	76.35	Miss. Riv. Com'n.
Natchez.....................	March 24 to 26.....	47.40	63.03	Miss. Riv. Com'n.
Alexandria..............	March 8-9............	33.60	76.80	Miss. Riv Com'n.
	June 1.................	35.25	78.45	Miss. Riv. Com'n.
Red River Landing....	March 29 to 31.....	47.30	49.89	Miss. Riv. Com'n.
Baton Rouge..............	March 24.............	36.20	35.00	Miss. Riv. Com'n.
Plaquemine...............	March 24.............	31.60	31.20	Miss. Riv. Com'n.
College Point.............	March 24.	24.05	24.03	Miss. Riv. Com'n.
Carrollton..................	March 18.............	15.60	15.25	Miss. Riv. Com'n.

HIGH WATER RECORD—1885.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	January 20	46.00	472.36	Miss. Riv. Com'n.
Louisville, upp'r gauge	January 21	21.70	420.20	Miss. Riv. Com'n.
Nashville	January 21	37.80	....	Weather Bureau.
Chattanooga	January 18	26.50	657.14	Miss. Riv. Com'n.
	November 9	30.40	661.04	Miss. Riv. Com'n.
St. Paul	June 18-19	7.40	680.40	Weather Bureau.
Davenport	May 9	10.00	543.76	Weather Bureau.
Omaha	June 17	16.60	975.31	Weather Bureau.
Kansas City	June 19	19.10	735.80	Weather Bureau.
St. Louis	March 16	24.10	403.07	Miss. Riv. Com'n.
	May 3	26.10	405.07	Miss. Riv. Com'n.
	June 23	26.75	405.72	Miss. Riv. Com'n.
Cairo	January 26	39.00	308.58	Miss Riv. Com'n.
	April 29	38.22	307.80	Miss. Riv. Com'n.
Fulton	January 28	29.92	237.21	Miss. Riv. Com'n.
	May 1	28.70	235.99	Miss. Riv. Com'n.
Memphis	January 28	29.25	211.96	Miss. Riv. Com'n.
	May 1-2	27.30	210.01	Miss. Riv. Com'n.
Helena	January 30	40.70	181.42	Miss. Riv. Com'n.
	May 4	38.75	179.47	Miss. Riv. Com'n.
Mouth White River	January 23 to 25	43.60	151.07	Miss. Riv. Com'n.
	May 5 to 7	43.50	150.97	Miss Riv. Com'n.
Fort Smith	April 26	27.90	402.15	Weather Bureau.
Little Rock	April 27 to 29	28.60	248.89	Miss. Riv. Com'n.
Arkansas City	Jan. 28 to Feb. 1	41.70	136.88	Miss. Riv. Com'n.
	May 8	42.60	137.78	Miss. Riv. Com'n.
Greenville	Jan. 31 to Feb. 1	37.60	124.35	Miss. Riv. Com'n.
	May 8	38.05	124.80	Miss Riv. Com'n.
Lake Providence	February 1 to 3	34.75	103.11	Miss. Riv. Com'n.
Vicksburg	February 3	42.40	87.18	Miss. Riv. Com'n.
St. Joseph	February 3	38.37	69.83	Miss. Riv. Com'n.
Natchez	February 3 to 5	42.60	58.23	Miss. Riv. Com'n.
Alexandria	January 25	34.30	77.50	Miss. Riv. Com'n.
	May 19-20	30.90	74.10	Miss. Riv. Com'n.
Red River Landing	February 5-6	41.96	44.51	Miss. Riv. Com'n.
Baton Rouge	Jan. 30 to Feb. 2	31.90	30.70	Miss. Riv. Com'n.
Plaquemine	Jan. 30 to Feb. 5	27.70	27.50	Miss. Riv. Com'n.
College Point	January 30-31	21.05	21.03	Miss. Riv. Com'n.
Carrollton	January 22-23	13.55	13.20	Miss. Riv. Com'n.
	May 10	12.65	12.30	Miss. Riv. Com'n.

HIGH WATER RECORD—1886.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	April 9	55.75	482.11	Miss. Riv. Com'n.
Louisville, upp'r gauge	April 10	32.70	431.20	Miss. Riv. Com'n.
Nashville	April 10-11	49.30	....	Weather Bureau.
Chattanooga	April 3	52.20	682.84	Miss. Riv. Com'n.
St. Paul	March 29 to 31	8.20	681.20	Weather Bureau.
Davenport	May 2	12.70	546.46	Weather Bureau.
Omaha	June 11-12	12.90	971.61	Weather Bureau.
Kansas City	April 17	15.80	732.50	Weather Bureau.
St. Louis	February 13	23.20	402.17	Miss. Riv. Com'n.
	April 21	23.70	402.67	Miss. Riv. Com'n.
	May 13	27.00	405.97	Miss. Riv. Com'n.
Cairo	April 19	50.98	321.56	Miss. Riv. Com'n.
Fulton	April 22	35.36	242.65	Miss. Riv. Com'n.
Memphis	April 28	34.80	217.51	Miss. Riv. Com'n.
Helena	April 30	48.10	188.82	Miss. Riv. Com'n.
Mouth White River	May 4	48.20	155.67	Miss. Riv. Com'n.
Fort Smith	February 14	14.90	399.15	Weather Bureau..
Little Rock	February 16	17.90	238.19	Miss. Riv. Com'n.
	April 19	16.10	236.39	Miss Riv. Com'n.
Arkansas City	May 5	46.90	142.08	Miss. Riv Com'n.
Greenville	May 6	41.17	127.91	Miss Riv. Com'n.
Lake Providence	May 7	37 91	106.27	Miss. Riv. Com'n.
Vicksburg	May 7-9	44.15	88.93	Miss Riv. Com'n.
Natchez	May 9 to 11	43.75	59.38	Miss. Riv. Com'n.
Alexandria	June 17	27.90	71.10	Miss. Riv. Com'n.
Red River Landing	May 31	41.94	44.53	Miss Riv. Com'n.
Baton Rouge	May 31 to June 2	32.10	30.90	Miss. Riv. Com'n.
Carrollton	May 31	13.80	13.45	Miss. Riv. Com'n.

HIGH WATER RECORD—1887.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 28	54.54	480.90	Miss Riv. Com'n.
Louisville, upp'r gauge	February 6	32.55	431.05	Miss Riv. Com'n.
Nashville	March 2	44.25	....	Weather Bureau.
Chattanooga	Feb. 28 to March 1	27.30	657.94	Miss. Riv. Com'n.
St. Paul	April 17	9.60	682.60	Weather Bureau.
Davenport	April 28-29	11.50	555.26	Weather Bureau.
Omaha	March 28	17.90	976.61	Weather Bureau.
Kansas City	April 1	20.20	736.90	Weather Bureau.
St. Louis	March 19	20.10	399.07	Miss. Riv. Com'n.
	April 1	20.40	399.37	Miss. Riv. Com'n.
Cairo	March 9-10	48.48	318.06	Miss. Riv. Com'n.
Fulton	March 12-13	34.60	241.89	Miss. Riv. Com'n.
Memphis	March 10	35.30	218.01	Miss. Riv Com'n.
Helena	March 21-22	46.30	187.02	Miss. Riv. Com'n.
Mouth White River	March 24-25	47.75	155.22	Miss. Riv. Com'n.
Little Rock	May 6	17.55	237.84	Miss. Riv. Com'n.
Arkansas City	March 25-26	46.65	141.83	Miss. Riv. Com n.
Greenville	March 21 to 25	40.80	127.54	Miss. Riv. Com'n.
Lake Providence	March 26	38.00	106.36	Miss. Riv. Com'n
Vicksburg	March 26 to 31	44.70	89.48	Miss. Riv. Com'n.
Natchez	March 31	44.20	59.83	Miss. Riv. Com'n.
Shreveport	December 24-25	21.60	161.61	Miss. Riv. Com'n.
Alexandria	March 24	14.92	58.12	Miss. Riv. Com'n.
	December 28-29	19.25	62.45	Miss. Riv. Com'n.
Red River Landing	April 8	43.00	45.59	Miss. Riv. Com'n.
Baton Rouge	April 10	33.55	32.25	Miss. Riv. Com'n.
Carrollton	April 6 to 9	14.50	14.15	Miss. Riv. Com'n.

HIGH WATER RECORD—1888.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	March 31	39.75	466.11	Miss. Riv. Com'n.
Louisville, upp'r gauge	April 1-2	16.05	414.55	Miss. Riv. Com'n.
Nashville	March 30	39.25	....	Weather Bureau.
Chattanooga	January 19	25.70	656.34	Miss. Riv. Com'n.
	March 31	27.00	657.64	Miss. Riv. Com'n.
St. Paul	May 11	14.10	687.10	Weather Bureau.
Davenport	May 15-16	18.60	552.36	Weather Bureau.
Omaha	June 30	16.30	975.01	Weather Bureau.
Kansas City	July 2-3	20.40	737.10	Weather Bureau.
St. Louis	June 4	29.38	408.35	Miss. Riv. Com'n.
Cairo	April 4	45.25	314.83	Miss. Riv. Com'n.
Fulton	April 10	33.60	240.89	Miss. Riv. Com'n.
Memphis	April 11-12	34.20	216.91	Miss. Riv. Com'n.
Helena	April 14-15	42.80	183.50	Miss. Riv. Com'n.
Mouth White River	April 20	45.55	153.02	Miss. Riv. Com'n.
Fort Smith	April 30 to May 2	16.30	390.55	Weather Bureau.
Little Rock	May 23	20.30	240.59	Miss. Riv. Com'n.
Arkansas City	April 22	45.37	140.55	Miss. Riv. Com'n.
Greenville	April 22-23	40.55	147.29	Miss. Riv. Com'n.
Lake Providence	April 24-25	38.10	106.46	Miss. Riv. Com'n.
Vicksburg	April 26	44.17	88.95	Miss. Riv. Com'n.
Natchez	April 27 to May 1	43.40	59.03	Miss. Riv. Com'n.
Shreveport	March 18	29.70	169.71	Miss. Riv. Com'n.
	May 19	30.30	170.31	Miss. Riv. Com'n.
Alexandria	March 27-28	29.60	72.80	Miss. Riv. Com'n.
Red River Landing	April 30	41.75	44.34	Miss. Riv. Com'n.
Baton Rouge	April 29 to May 3	32.50	31.30	Miss. Riv. Com'n.
Carrollton	April 26	14.35	14.10	Miss. Riv. Com'n.

HIGH WATER RECORD—1889.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Cincinnati	February 22	38.08	464.44	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 23	13.80	412.30	Miss. Riv. Com'n.
Nashville	February 21	35.75	....	Miss. Riv. Com'n.
Chattanooga	February 18	29.60	660.24	Miss. Riv. Com'n.
St. Paul	May 21	4.50	677.50	Weather Bureau.
Davenport	April 4-5	5.30	539.06	Weather Bureau.
Omaha	July 1	9.70	968.41	Weather Bureau.
Kansas City	August 14	13.90	730.60	Weather Bureau.
St. Louis	March 5	16.60	395.57	Miss. Riv. Com'n.
	June 1	24.62	403.59	Miss. Riv. Com'n.
Cairo	February 26	32.80	302.39	Miss Riv. Com'n.
	June 24	34.50	304.09	Miss. Riv. Com'n.
Fulton	January 22-23	22.85	230.14	Miss. Riv. Com'n.
	February 28	23.95	231.24	Miss. Riv. Com'n.
	June 26	25.64	232.93	Miss. Riv. Com'n.
Memphis	January 24	23.80	206.51	Miss. Riv. Com'n.
	June 27	26.55	209.26	Miss. Riv. Com'n.
Helena	January 25	31.35	172.07	Miss. Riv. Com'n.
	June 28	34.10	174.82	Miss. Riv. Com'n.
Mouth White River	January 26	37.10	144.57	Miss. Riv. Com'n.
	June 29-30	37.65	145.12	Miss. Riv. Com'n.
Fort Smith	March 26	20.00	394.25	Weather Bureau.
Little Rock	January 19-20	23.00	243.29	Miss. Riv. Com'n.
	March 28	23.05	243.34	Miss. Riv. Com'n.
Arkansas City	January 27	35.50	130.68	Miss. Riv. Com'n.
	March 8-9	35.00	130.18	Miss. Riv. Com'n.
	June 30	36.25	131.43	Miss. Riv. Com'n.
Greenville	January 27	31.60	118.37	Miss. Riv. Com'n.
	March 7	30.65	117.42	Miss. Riv. Com'n.
	July 1	31.82	118.59	Miss. Riv Com'n.
Lake Providence	January 29	28.78	97.14	Miss. Riv. Com'n.
	March 9-10	28.30	96.66	Miss. Riv. Com'n.
	July 1	29.40	97.77	Miss. Riv. Com'n.
Vicksburg	January 29	33.78	78.56	Miss. Riv. Com'n.
	March 11	33.55	78.33	Miss. Riv. Com'n.
	July 3	34.43	79.21	Miss. Riv. Com'n.
St. Joseph	February 1	30.25	63.71	Miss. Riv. Com'n.
	March 12	30.35	63.81	Miss. Riv Com'n.
	July 3	30.58	64.04	Miss. Riv. Com'n.
Natchez	Jan. 30 to Feb. 1	33.80	49.43	Miss. Riv. Com'n.
	March 12-13	34.15	49.78	Miss. Riv. Com'n.
	July 5	33.65	49.28	Miss. Riv. Com'n.
Shreveport	February 3	31.90	171.91	Miss. Riv. Com'n.
Alexandria	February 13	31.50	74.70	Miss. Riv. Com'n.

HIGH WATER RECORD—1889.—Continued.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Red River Landing.	February 12.........	33.60	36.19	Miss. Riv. Com'n.
	March 14.............	33.99	36.58	Miss. Riv. Com'n.
	July 6..................	31.76	34.35	Miss. Riv. Com'n.
Bayou Sara.............	February 12-13.....	27.50	30.19	Miss. Riv. Com'n.
	March 13-14........	28.00	30.59	Miss. Riv. Com'n.
	July 5-6...............	25.50	28.09	Miss. Riv. Com'n.
Baton Rouge...........	February 12	26.20	25.00	Miss. Riv. Com'n.
	March 14.............	26.75	25.55	Miss. Riv. Com'n.
	July 6..................	24.40	23.20	Miss. Riv. Com'n.
Plaquemine	February 12-13.....	22.50	22.30	Miss. Riv. Com'n.
	March 13-14.........	23.00	22.80	Miss. Riv. Com'n.
	July 5..................	20.70	20.50	Miss. Riv. Com'n.
College Point..........	February 10-12.....	17.00	16.98	Miss. Riv. Com'n.
	March 13-14........	17.48	17.46	Miss. Riv. Com'n.
	July 6..................	15.85	15.83	Miss. Riv. Com'n.
Carrollton...............	February 16.........	11.05	10.75	Miss. Riv. Com'n.
	March 13-14.........	11.55	11.20	Miss. Riv. Com'n.
	July 4 to 7...........	10.65	10.30	Miss. Riv. Com'n.

HIGH WATER RECORD—1890.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	March 24	22.50	719.48	Weather Bureau.
Cincinnati	March 25-26	58.90	485.26	Miss. Riv. Com'n.
Louisville, upp'r gauge	March 28	35.40	433.90	Miss. Riv. Com'n.
Nashville	March 6	50.70	....	Miss. Riv. Com'n.
Chattanooga	March 2	42.50	673.14	Miss. Riv. Com'n.
St. Paul	June 23	7.0	680.00	Weather Bureau.
Davenport	June 29	11.7	545.46	Weather Bureau.
Omaha	June 9	12.9	971.61	Weather Bureau.
Kansas City	June 11	17.2	733.92	Weather Bureau.
St. Louis	July 1	20.60	399.57	Miss. Riv. Com'n.
Cairo	March 12	48.80	314.38	Miss. Riv. Com'n.
Fulton	March 22	34.90	242.19	Miss. Riv Com'n.
Memphis	March 16-17	35.60	218.31	Miss. Riv. Com'n.
Helena	March 28 to 30	47.70	188.42	Miss. Riv. Com'n.
Mouth White River	March 31	50.40	157.87	Miss. Riv. Com'n.
Fort Smith	Mar. 12 to April 28	21.0	395.25	Weather Bureau.
Little Rock	April 29	26.80	247.09	Miss. Riv. Com'n.
Arkansas City	March 27	49.50	144.68	Miss. Riv. Com'n.
Greenville	March 17-18-26-27.	43.40	130.14	Miss. Riv. Com'n.
Lake Providence	March 22 to 26	40.30	108.66	Miss. Riv. Com'n.
Vicksburg	March 15	48.00	92.78	Miss. Riv. Com'n.
	April 23 to 27	49.00	93.77	Miss. Riv. Com'n.
St. Joseph	March 15	44.10	75.56	Miss. Riv. Com'n.
	April 23 to 25	45.10	76.56	Miss. Riv. Com'n.
Natchez	March 15-16	46.90	62.53	Miss. Riv. Com'n.
	April 23	48.60	64.23	Miss. Riv. Com'n.
Shreveport	May 7	34.40	174.41	Miss. Riv. Com'n.
Alexandria	May 19	36.80	80.00	Miss. Riv. Com'n.
Red River Landing.	March 17 to 23	45.00	47.59	Miss. Riv. Com'n.
	April 23	48.60	51.19	Miss. Riv. Com'n.
Bayou Sara	March 18 to 20	38.50	41.09	Miss. Riv. Com'n.
	April 21	41.20	43.69	Miss. Riv. Com'n.
Baton Rouge	March 16 to 18	35.40	34.20	Miss. Riv. Com'n.
	April 21	36.60	35.40	Miss. Riv. Com'n.
Plaquemine	March 16-17	31.40	31.20	Miss. Riv. Com'n.
	April 22	31.90	31.70	Miss. Riv. Com'n.
College Point	March 16	23.80	23.78	Miss. Riv. Com'n.
Carrollton	March 14 to 17	16.00	15.65	Miss. Riv. Com'n.
New Orleans	March 21	16.70	14.19	Weather Bureau.

HIGH WATER RECORD—1891.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	February 18	31.30	728.28	Weather Bureau.
Cincinnati.	February 25	57.30	483.66	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 27	32.40	430.90	Miss. Riv. Com'n.
Nashville	March 13-14	49.20	....	Miss. Riv. Com'n.
Chattanooga	February 14	37.50	668.14	Miss. Riv. Com'n.
St. Paul	April 17	6.4	679.40	Weather Bureau.
Davenport	May 3 to 5	10.3	544.06	Weather Bureau.
Omaha	June 29-30	14.4	973.11	Weather Bureau..
Kansas City	July 1	23.1	739.80	Weather Bureau..
St. Louis	July 4	23.70	402.67	Miss. Riv. Com'n.
Cairo	March 3 to 6	46.20	315.78	Miss. Riv. Com'n.
Fulton	March 14	33.90	241.19	Miss. Riv. Com'n.
Memphis	March 13-14	34.70	217.41	Miss. Riv. Com'n.
Helena	March 26 to 28	44.70	185.42	Miss. Riv. Com'n.
Mouth White River	April 5-6	47.70	155.17	Miss. Riv. Com'n.
Fort Smith	June 8	20.4	394.65	Weather Bureau.
Little Rock	April 23	22.60	242.89	Miss. Riv. Com'n.
Arkansas City	April 3 to 7	48.20	143.38	Miss. Riv. Com'n.
Greenville	April 1 to 3	43.20	129.94	Miss. Riv. Com'n.
Lake Providence	Mar. 31 to April 4	41.00	109.36	Miss. Riv. Com'n.
Vicksburg	April 2 to 4	48.10	92.88	Miss. Riv. Com'n.
St. Joseph	April 11	43.80	75.26	Miss. Riv. Com'n.
Natchez	April 11-12	46.50	62.13	Miss. Riv. Com'n.
Shreveport	February 12-13	25.20	165.21	Miss. Riv. Com'n.
Alexandria	February 17	30.0	73.20	Miss. Riv. Com'n.
Red River Landing	April 26 to May 4	45.50	47.79	Miss. Riv. Com'n.
Bayou Sara	April 29 to May 6	38.80	41.49	Miss. Riv. Com'n.
Baton Rouge	April 26 to 29	35.50	34.30	Miss. Riv. Com'n.
Plaquemine	April 29 to May 8	31.10	30.80	Miss. Riv. Com'n.
Donaldsonville	March 18	27.90	27.88	Miss. Riv. Com'n.
College Point	March 16	23.40	23.38	Miss. Riv. Com'n.
Carrollton	March 16	16.00	15.65	Miss. Riv. Com'n.
New Orleans	March 17-18	16.40	13.89	Weather Bureau.
Fort Jackson	March 31	6.40	4.40	Miss. Riv. Com'n.

HIGH WATER RECORD—1892.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	January 15	22.90	729.88	Weather Bureau.
Cincinnati	April 25	43.80	470.16	Miss. Riv. Com'n.
Louisville, upp'r gauge	April 23	21.60	420.10	Miss. Riv. Com'n.
Nashville	April 26	38.80	....	Miss. Riv. Com'n.
Chattanooga	April 10	34.30	664.94	Miss. Riv. Com'n.
St. Paul	May 26	12.60	685.60	Weather Bureau.
Davenport	June 27	19.40	553.16	Weather Bureau.
Omaha	May 21	24.90	983.61	Weather Bureau.
St. Louis	May 19	36.00	414.97	Miss. Riv. Com'n.
Cairo	April 28	48.30	317.88	Miss. Riv. Com'n.
Fulton	April 29 to May 3	34.20	241.49	Miss. Riv. Com'n.
Memphis	May 2-3	34.60	217.31	Miss. Riv. Com'n.
Helena	May 11-12	45.70	186.42	Miss. Riv. Com'n.
Mouth White River	June 1	49.30	156.77	Miss. Riv. Com'n.
Fort Smith	May 19	30.90	405.15	Weather Bureau.
Little Rock	May 21	31.20	251.49	Miss. Riv. Com'n.
Arkansas City	June 1	50.00	145.18	Miss. Riv. Com'n.
Greenville	June 1-2	44.20	130.94	Miss. Riv. Com'n.
Lake Providence	June 2	41.90	110.26	Miss. Riv. Com'n.
Vicksburg	June 2 to 4	48.40	93.18	Miss. Riv. Com'n.
St. Joseph	June 2 to 5	44.50	75.96	Miss. Riv. Com'n.
Natchez	June 26	48.10	63.73	Miss. Riv. Com'n.
Shreveport	May 28	35.60	175.61	Miss. Riv. Com'n.
Alexandria	June 12 to 14	38.20	81.40	Miss. Riv. Com'n.
Red River Landing	June 26 to 30	48.80	51.39	Miss. Riv. Com'n.
Bayou Sara	June 27 to 30	42.20	44.89	Miss. Riv. Com'n.
Baton Rouge	June 26 to 28	38.40	37.20	Miss. Riv. Com'n.
Plaquemine	June 26 to 28	33.20	33.00	Miss. Riv. Com'n.
Donaldsonville	June 13	30.20	30.18	Miss. Riv. Com'n.
College Point	June 12-13	25.40	25.38	Miss. Riv. Com'n.
Carrollton	June 12-13	17.20	16.85	Miss. Riv. Com'n.
New Orleans	June 11	17.60	15.09	Weather Bureau.
Fort Jackson	June 12-13	6.80	4.80	Miss. Riv. Com'n.

HIGH WATER RECORD—1893.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	February 8	23.10	720.08	Weather Bureau.
Cincinnati	February 21	54.60	480.96	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 21	28.70	427.20	Miss. Riv. Com'n.
Nashville	February 22	40.80	....	Miss. Riv. Com'n.
Chattanooga	February 20	33.4	664.04	Miss. Riv. Com'n.
St. Paul	May 5 to 7	14.70	687.70	Weather Bureau.
Davenport	May 14	13.60	547.36	Weather Bureau.
Omaha	April 12	15.10	973.81	Weather Bureau.
Kansas City	April 18	18.10	734.80	Weather Bureau.
St. Louis	May 3	31 60	410.57	Miss. Riv. Com'n.
Cairo	February 28	44.90	314.48	Miss. Riv. Com'n.
	May 8 to 10	49.30	318.82	Miss. Riv. Com'n.
Fulton	March 4-5	32.20	239.49	Miss. Riv. Com'n.
	May 13 to 17	34.60	241.89	Miss. Riv. Com'n.
Memphis	March 3	33.00	215.71	Miss. Riv. Com'n.
	May 15 to 17	35.20	217.91	Miss. Riv Com'n.
Helena	March 6-7	41.80	182.52	Miss. Riv. Com'n.
	May 25	47.90	188.62	Miss. Riv. Com'n.
Mouth White River	March 9-10	44.30	151.77	Miss. Riv. Com'n.
	May 29	49.50	156.97	Miss. Riv. Com'n.
Fort Smith	May 1	26.80	401.05	Weather Bureau.
Little Rock	May 3	27.20	247.49	Miss. Riv. Com'n.
Arkansas City	March 10 to 13	43.20	138.38	Miss. Riv. Com'n.
	May 28-29	50.20	145.38	Miss. Riv. Com'n.
Greenville	May 29	44.30	131.04	Miss. Riv. Com'n.
Lake Providence	May 15 to 22	41.80	110.16	Miss. Riv. Com'n.
Vicksburg	May 22-23	48.30	93.18	Miss. Riv. Com'n.
St. Joseph	May 22-23	44.10	75.56	Miss. Riv. Com'n.
Natchez	May 22 to 24	46.80	62.43	Miss. Riv. Com'n.
Shreveport	January 1	29.10	169.11	Miss. Riv. Com'n.
Alexandria	January 6-7	32.20	75.40	Miss. Riv. Com'n.
Red River Landing	June 24 to 28	47.70	50.29	Miss. Riv. Com'n.
Bayou Sara	June 24-25	41.50	44.19	Miss. Riv. Com'n.
Baton Rouge	June 23	38.40	37.20	Miss. Riv. Com'n.
Plaquemine	June 23	33.80	33.50	Miss. Riv. Com'n.
Donaldsonville	June 23	30.60	30.58	Miss. Riv. Com'n.
College Point	June 23	25.90	25.88	Miss. Riv. Com'n.
Carrollton	June 22 to 24	17.40	17.05	Miss. Riv. Com'n.
New Orleans	June 24	17.90	15.39	Weather Bureau.
Fort Jackson	June 15	6.60	4.60	Miss. Riv. Com'n.

HIGH WATER RECORD—1894.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	May 22	22.50	719.48	Weather Bureau.
Cincinnati	February 15	35.60	461.96	Miss. Riv. Com'n.
	May 27	31.90	458.26	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 14	12.70	411.20	Miss. Riv. Com'n.
Nashville	February 9	42.00	....	Miss. Riv. Com'n.
Chattanooga	February 6	25.50	656.14	Miss. Riv. Com'n.
St. Paul	May 21	11.80	684.80	Weather Bureau.
Davenport	May 31	12.30	546.06	Weather Bureau.
Omaha	April 14	15.10	973.81	Weather Bureau.
Kansas City	June 20-21	20.10	736.80	Weather Bureau.
St. Louis	March 10	20.20	399.17	Miss. Riv. Com'n.
	May 11	23.40	402.37	Miss. Riv. Com'n.
Cairo	February 16	37.00	306.58	Miss. Riv. Com'n.
Fulton	February 18-19	27.80	230.09	Miss. Riv. Com'n.
Memphis	February 19-20	29.00	211.71	Miss. Riv. Com'n.
Helena	February 21	38.10	178.82	Miss. Riv. Com'n.
Mouth White River	February 23-24	42.10	149.57	Miss. Riv. Com'n.
Fort Smith	March 8-9	17.60	391.85	Weather Bureau.
Little Rock	March 22	24.80	245.09	Miss. Riv. Com'n.
Arkansas City	February 24-25	40.50	135.68	Miss. Riv. Com'n.
Greenville	February 25	35.40	122.17	Miss. Riv. Com'n.
Lake Providence	February 26	34.40	102.76	Miss. Riv. Com'n.
Vicksburg	February 27	40.30	85.08	Miss. Riv. Com'n.
St. Joseph	April 2-3	36.90	68.36	Miss. Riv. Com'n.
Natchez	April 3-4	40.60	56.25	Miss. Riv. Com'n.
Shreveport	April 2	34.40	174.41	Miss. Riv. Com'n.
Alexandria	April 12-13	35.10	78.30	Miss. Riv. Com'n.
Red River Landing	April 5-6	39.50	42.09	Miss. Riv. Com'n.
Bayou Sara	April 5 to 7	33.10	35.79	Miss. Riv. Com'n.
Baton Rouge	April 5-6	30.90	29.70	Miss. Riv. Com'n.
Plaquemine	April 6	26.80	26.50	Miss. Riv. Com'n.
Donaldsonville	April 6	24.40	24.38	Miss. Riv. Com'n.
College Point	April 6	20.50	20.48	Miss. Riv. Com'n.
Carrollton	April 5 to 7	13.40	13.05	Miss. Riv. Com'n.
New Orleans	April 6	14.60	12.09	Weather Bureau.
Fort Jackson	April 8-9	5.80	3.80	Miss. Riv. Com'n.

HIGH WATER RECORD—1895.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	January 8	25.70	722.68	Weather Bureau.
Cincinnati	March 7	36.80	463.16	Miss. Riv. Com'n.
	March 19	36.40	462.76	Miss. Riv. Com'n.
Louisville, upp'r gauge	January 15	20.60	419.10	Miss. Riv. Com'n.
Nashville	March 25	31.60	....	Miss. Riv. Com'n.
Chattanooga	January 12	32.10	662.74	Miss. Riv. Com'n.
St. Paul	June 16-17	4.60	677.60	Weather Bureau.
Davenport	March 4	8.90	542.66	Weather Bureau.
Omaha	April 7-8	11.20	969.91	Weather Bureau.
	June 8-9	12.00	970.71	Weather Bureau.
Kansas City	June 12	16.90	733.60	Weather Bureau.
St. Louis	December 22	23.40	402.37	Miss. Riv. Com'n.
Cairo	January 21-22	33.00	302.58	Miss Riv. Com'n.
	March 25-26	32.30	301.88	Miss. Riv. Com'n.
Fulton	January 23-24	23.00	230.29	Miss. Riv. Com'n.
	March 28	23.00	230.29	Miss Riv. Com'n.
Memphis	February 23-25	24.00	206.71	Miss. Riv. Com'n.
	March 29	24.00	206.71	Miss. Riv. Com'n.
Helena	January 25-26	31.00	171.72	Miss. Riv. Com'n.
	March 30-31	31.20	171.92	Miss. Riv. Com'n.
Mouth White River	January 27	32.60	140.07	Miss. Riv. Com'n.
	April 1	34.40	141.87	Miss. Riv. Com'n.
Fort Smith	December 26	27.60	401.85	Weather Bureau.
Little Rock	December 28	25.70	245.99	Miss. Riv. Com'n.
Arkansas City	January 28	30.90	126.08	Miss. Riv. Com'n.
	April 1	32.50	127.68	Miss. Riv. Com'n.
Greenville	January 27	26.30	113.04	Miss. Riv. Com'n.
	April 1	27.70	114.44	Miss. Riv. Com'n.
Lake Providence	January 28-29	23.90	92.26	Miss. Riv. Com'n.
	April 2-3	25.90	94.26	Miss. Riv. Com'n.
Vicksburg	January 29-30	29.10	73.88	Miss. Riv. Com'n.
	April 3	31.70	76.48	Miss. Riv. Com'n.
St. Joseph	January 30	25.20	56.66	Miss. Riv. Com'n.
	April 4-5	27.80	59.26	Miss. Riv. Com'n.
Natchez	Jan. 31, Feb. 1	28.60	44.23	Miss. Riv. Com'n.
	April 4-5	31.50	47.13	Miss. Riv. Com'n.
Shreveport	July 29	30.30	170.31	Miss. Riv. Com'n.
Alexandria	August 5	28.20	71.40	Miss. Riv. Com'n.
Red River Landing.	February 1	26.90	29.49	Miss. Riv. Com'n.
	April 4-6	31.20	33.79	Miss. Riv. Com'n.
Bayou Sara	February 2	20.70	23.92	Miss. Riv. Com'n.
	April 5-6	24.70	27.70	Miss. Riv. Com'n.
Baton Rouge	February 2	19.70	18.50	Miss. Riv. Com'n.
	April 6	23.60	22.40	Miss. Riv. Com'n.

HIGH WATER RECORD—1895.—Continued.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Plaquemine	February 3	16.10	15.90	Miss. Riv. Com'n.
	April 6-7	20.00	19.80	Miss. Riv. Com'n.
Donaldsonville	February 3	14.70	14.68	Miss. Riv. Com'n.
	April 6	18.60	18.58	Miss. Riv. Com'n.
College Point	February 2	11.80	11.78	Miss. Riv. Com'n.
	April 6	15.10	15.08	Miss. Riv. Com'n.
Carrollton	February 4	7.70	7.35	Miss Riv. Com'n.
	April 8	10.10	9.75	Miss. Riv. Com'n.
New Orleans	April 8	11.10	8.59	Weather Bureau.
Fort Jackson	February 2	3.80	1.80	Weather Bureau.
	April 4	4.40	2.40	Miss. Riv. Com'n.

HIGH WATER RECORD—1896.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	April 1	19.40	716.38	Weather Bureau.
Cincinnati	April 4	47.70	474.06	Miss. Riv. Com'n.
Louisville, upp'r gauge	April 5	22.40	420.90	Miss. Riv. Com'n.
Nashville	April 7-8	42.80	....	Miss. Riv. Com'n.
Chattanooga	April 5	40.50	671.14	Miss. Riv. Com'n.
St. Paul	May 5	9.9	682.90	Weather Bureau.
	May 21-22	10.5	683.50	Weather Bureau.
Davenport	May 4-5	10.4	544.16	Weather Bureau.
Omaha	April 9	11.7	970.41	Weather Bureau.
	May 20	11.4	970.11	Weather Bureau.
Kansas City	April 9	15.8	732.50	Weather Bureau.
	May 22	19.2	735.90	Weather Bureau.
St. Louis	May 26	27.70	406.67	Miss. Riv. Com'n.
Cairo	February 18	32.30	301.88	Miss. Riv. Com'n.
	April 13	39.10	308.68	Miss. Riv. Com'n.
Fulton	February 19-20	22.80	230.09	Miss. Riv. Com'n.
	April 15	28.10	235.39	Miss. Riv. Com'n.
Memphis	February 20	23.80	206.51	Miss. Riv. Com'n.
	April 15-16	29.40	212.11	Miss. Riv. Com'n.
Helena	February 21-22	31.00	171.72	Miss. Riv. Com'n.
	April 17	38.40	179.12	Miss. Riv. Com'n.
Mouth White River	February 22-23	35.60	143.07	Miss. Riv. Com'n.
	April 18-19	41.60	149.07	Miss. Riv. Com'n.
Fort Smith	January 2	14.70	388.95	Weather Bureau.
Little Rock	January 1	23.00	243.29	Miss. Riv. Com'n.
Arkansas City	February 23-24	33.70	128.84	Miss. Riv. Com'n.
	April 19	40.00	135.18	Miss. Riv. Com'n.
Greenville	February 23-24	28.80	115.54	Miss. Riv. Com'n.
	April 20	34.60	121.34	Miss. Riv. Com'n.
Lake Providence	February 24	27.40	95.76	Miss. Riv. Com'n.
	April 20-21	33.20	101.56	Miss. Riv. Com'n.
Vicksburg	February 25	32.60	77.38	Miss. Riv. Com'n.
	April 21	39.00	83.78	Miss. Riv. Com'n.
St. Joseph	February 26	29.70	61.16	Miss. Riv. Com'n.
	April 22	35.20	66.66	Miss. Riv. Com'n.
Natchez	February 25 to 27.	33.00	48.65	Miss. Riv. Com'n.
	April 22-23	38.20	53.83	Miss. Riv. Com'n.
Shreveport	February 25-26	17.50	157.51	Miss. Riv. Com'n.
Alexandria	February 6	26.40	69.60	Miss. Riv. Com'n.
Red River Landing.	February 27-28	33.40	35.99	Miss. Riv. Com'n.
	April 23-24	37.40	39.99	Miss. Riv. Com'n.
Bayou Sara	February 27-28	26.80	29.49	Miss. Riv. Com'n.
	April 23-24	30.70	33.39	Miss. Riv. Com'n.
Baton Rouge	February 28	25.60	24.40	Miss. Riv. Com'n.
	April 23 to 25	28.80	27.60	Miss. Riv. Com'n.

HIGH WATER RECORD—1896.—Continued.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Plaquemine	February 28	22.30	22.10	Miss. Riv. Com'n.
	April 22 to 24	25.10	24.90	Miss. Riv. Com'n.
Donaldsonville	February 26-27	20.40	20.38	Miss. Riv. Com'n.
	April 22 to 25	23.00	22.98	Miss. Riv. Com'n.
College Point	February 28-29	16.90	16.88	Miss. Riv. Com'n.
	April 22-24	19.20	19.18	Miss. Riv. Com'n.
Carrollton	March 1	11.50	11.15	Miss. Riv. Com'n.
	April 24-25	13.60	13.25	Miss. Riv. Com'n.
New Orleans	April 23	14.70	12.19	Weather Bureau.
Fort Jackson	February 29	5.00	3.00	Miss. Riv. Com'n.
	April 19	5.90	3.90	Miss. Riv. Com'n.

HIGH WATER RECORD—1897.

STATION	DATE OF READING	Recorded height on gauge—feet	Elevation above mean gulf level—feet	AUTHORITY
Pittsburg	February 24	28.90	725.88	Weather Bureau.
Cincinnati	February 26	61.10	487.46	Miss. Riv. Com'n.
Louisville, upp'r gauge	February 28	35.30	433.80	Miss. Riv. Com'n.
Nashville	March 20	48.80	....	Miss. Riv. Com'n.
Chattanooga	March 14-15	37.90	678.54	Miss. Riv. Com'n.
St. Paul	April 6	18.0	691.00	Weather Bureau.
Davenport	April 17	15.0	548.76	Weather Bureau.
Omaha	April 15 to 17	17.1	975.81	Weather Bureau.
Kansas City	April 17	27.8	744.50	Weather Bureau.
St. Louis	May 2	30.90	409.87	Miss. Riv. Com'n.
Cairo	March 25 to 28	51.70	321.28	Miss. Riv. Com'n.
Fulton	March 23	37.50	244.79	Miss. Riv. Com'n.
Memphis	March 20-21	37.60	220.31	Miss. Riv. Com'n.
Helena	April 4	51.84	192.52	Miss Riv. Com'n.
Mouth White River	March 29	52.40	159.87	Miss. Riv Com'n.
Fort Smith	March 20	17.00	391.25	Weather Bureau.
Little Rock	March 22	22.90	243.19	Miss. Riv. Com'n.
Arkansas City	March 29	51.90	147.08	Miss. Riv. Com'n.
Greenville	March 29	46.70	133.44	Miss. Riv. Com'n.
Lake Providence	March 30	44.40	112.76	Miss. Riv. Com'n.
	April 15 to 17	44.20	112.56	Miss. Riv. Com'n.
Vicksburg	March 31	49.40	94.18	Miss. Riv. Com'n.
	April 16	52.40	97.18	Miss. Riv. Com'n.
St. Joseph	April 17	47.80	79.26	Miss. Riv. Com'n.
Natchez	April 29 to May 6	49.80	65.47	Miss. Riv. Com'n.
Shreveport	April 11-12-13	24.10	164.11	Miss. Riv. Com'n.
Alexandria	April 14-15-16	26.20	69.40	Miss. Riv. Com'n.
Red River Landing	May 13 to 16	50.20	52.79	Miss. Riv. Com'n.
Bayou Sara	May 14-15	43.70	46.39	Miss. Riv. Com'n.
Baton Rouge	May 13 to 18	40.60	39.40	Miss. Riv. Com'n.
Plaquemine	May 10 to 17	36.20	36.00	Miss. Riv. Com'n.
Donaldsonville	May 13	32.80	32.78	Miss. Riv. Com'n.
College Point	May 15	28.00	27.98	Miss. Riv. Com'n.
Carrollton	May 12-13	19.00	18.65	Miss. Riv. Com'n.
New Orleans	May 13	19.50	16.99	Weather Bureau.
Fort Jackson	April 29-30	7.20	5.20	Miss. Riv. Com'n.
	May 9-12	7.20	5.20	Miss. Riv. Com'n.

NOTE:—"Mean Gulf Level" as determined by the Mississippi River Commission at Biloxi, Miss., is 21.26 feet above the plane of reference used by Engineers, known as "Cairo Datum," or 8.13 feet above the plane of reference known as "Memphis Datum."

APPENDIX E.

List of Acts from 1877 to 1896, inclusive, relative to levees and to the duties of the Board of State Engineers, and of Articles of the Constitution of 1879 relative to levees.

APPENDIX E.

LIST OF ACTS FROM 1877 TO 1896, INCLUSIVE, RELATIVE TO LEVEES, AND TO THE DUTIES OF THE BOARD OF STATE ENGINEERS, AND OF ARTICLES OF THE CONSTITUTION OF 1879 RELATIVE TO LEVEES.

SESSION OF 1877.

Act 6.—Asking aid of National Government to rebuild and repair levees.

EXTRA SESSION OF 1877.

Act 46.—Relative to Fordoche and Grosse Tete Levee District, and amending an Act of 1876.

Amended by Act 121, of 1877, Extra Session.

Act 47.—Making appropriations for expenses of State.

Act 97.—Relative to the duties of Board of State Engineers with regard to Barataria Ship Canal.

Act 117.—Duties of Board of State Engineers relative to removing obstructions at mouth of Red River.

Act 121.—Amending Section 14, of Act 46, 1877, Extra Session, relative to Fordoche and Grosse Tete Levee District.

Act 139.—Repealing the Acts creating the Louisiana Levee Company.

Act 140.—Repealing the previous acts constituting a State Board of Engineers, and providing for the creation of a new Board of Engineers, and vesting the control of levees in the Police Juries.

Amended by Act 69, of 1878.

Repealed by Act 5, of 1878, Extra Session

Act 76.—Providing for a hydrographic and topographic survey of Bayou Bœuf by State Engineer.

Act 119.—State Engineer to make hydrographic and topographic survey of Bayou Teche, commencing at Iberia and extending to the junction of said stream with the Courtableau.

SESSION OF 1878.

Act 1.—Requesting aid for levees from Congress.

Act 9.—Authorizing Board of State Engineers to use certain funds reserved by Act 139, of 1877. Also providing for travelling expenses of Board.

Act 31.—Authorizing Governor to appoint a Commission with regard to forming a levee district from mouth of Arkansas River to mouth of Red River.

Act 69.—Amending Section 6, Act 140, of 1877, Extra Session, relative to payment of levee work.

Act 83.—Ordering State Engineers to survey Bayou Gross Tete.

Act 86.—Relative to connection of Board of State Engineers with Plaquemines Parish Canal Company.

EXTRA SESSION OF 1878.

Act 3.—Appropriations for expenses of State.

Act 5.—Repealing Act 140, of 1877, Extra Session. Creating a new Board of State Engineers. Creating Levee Districts and Levee Commissioners therefor. Imposing district taxes on land and on products. Giving control of levees to Police Juries. Providing for the closing of Bonnet Carre.

Repealed by Act 33, of 1879.

SESSION OF 1879.

Act 14.—Appropriations for expenses of State.

Act 33.—Repealing Act 5, of 1878, Extra Session. Creating new Board of State Engineers. Ordering the levy of a one mill levee tax all over the State. Reforming the various levee districts. Limiting district taxation to a five mill tax *ad valorem* on real estate. Giving control of levees to Police Juries.

Amended by Act 44, of 1886.
Amended by Act 97, of 1890.
Amended by Act 13, of 1892.
Amended by Act 14, of 1892.

CONSTITUTION OF 1879.

Article 204.—Ordering taxation for levee purposes.

Article 213.—Ordering maintenance of levees, and levying a one mill tax therefor.

Article 213.—Ordering creation of levee districts, and limiting district taxation to five mills. Amendment proposed by Act 112, of 1884. Carried by election of April 17, 1888. Made operative by Act 8, of 1888.

Article 215.—Cancelling Articles 213 and 214, when Federal Government shall have taken charge of levees, and giving freedom of action to Mississippi River Commission.

Article 216.—Authorizing creation of levee districts partly in other States.

Article 3.—(Miscellaneous ordinances relief of tax payers) Relative to Levee Company warrants.

SESSION OF 1880.

Act 71.—Appropriations for expenses of State.

Act 88.—Providing for protection of levees by Police Juries, also defining how levees can be cut for rice flumes, etc.

Amended by Act 104, of 1882.

Amended by Act 84, of 1884.

Amended by Act 112, of 1886.

Act 102.—Transferring levee and drainage money to General Engineer Fund.

EXTRA SESSION OF 1881.

Act 5.—Appropriations for expenses of State.

SESSION OF 1882.

Act 2.—Asking Congress' aid for building levees.

Act 10.—Declaring the building of levees works of public improvement.

Act 41.—Empowering Police Juries, except that of Orleans, to levy an annual tax to carry on works of public improvement.

Act 55.—For relief of Mrs. Hardee, widow of ex-chief State Engineer.

Act 56.—Authorizing relief of overflowed sufferers to be taken out of Levee and Drainage Funds.

Act 59.—Relative to the re-assessment of overflowed lands and property.

Act 63.—Appropriations for State expenses.

Act 73.—Relative to distribution of levee funds.

Amended by Act 83, of 1884.

Amended by Act 60, of 1886.

Act 97.—Authorizing Grosse Tete Levee District to issue bonds.

Act 99.—Authorizing appointment of an additional State Engineer.

Amended by Act 48, of 1884.

Act 104.—Amending Sections 3, 10, 11, 12 and 14 of Act 88, of 1880; Relating to protection of levees by Police Juries, and their cutting for rice flumes.

Repealed by Act 84, of 1884.

Repealed by Act 112, of 1886.

Act 126.—Prescribing how to hold special elections for the levying of special taxes for the works of public improvements, etc.

SESSION OF 1884.

Act 7.—Relative to making cut-offs.

Act 12.—Transferring Levee and Drainage Fund money to General Engineer Fund.

Act 20.—Prohibiting collection of district levee taxes in the Fifth Municipal District, parish of Orleans.

Act 26.—Creating Tensas Basin Levee District.

Repealed by Act 59, of 1886.

Repealed by Act 77, of 1888.

Act 33.—Appropriation for Mill Bayou Culvert.

Act 48.—Amending Act 99, of 1892, appointing additional State Engineer.

Act 52.—General Appropriation Bill.

Act 59.—Relative to postponement of payment of taxes, years of overflows.

Act 83.—Amending Act 73, of 1882, relative to distribution of levee funds.

Amended by Act 60, of 1886.

Amended by Act 102, of 1892.

Act 84.—Repealing Acts 88, of 1880, and 104, of 1882, prescribing for care and preservation of levees by Police Juries, and for their cutting for rice-flumes.

Amended by Act 112, of 1886.

Act 85.—Authorizing contract with James & McGinty for construction of levees.

Act 112.—Proposing amendment to Article 214, of Constitution, by providing a limit of ten mills for district taxation, and stating how more can be levied.

Carried by election of April 17, 1888. See Act 8, of 1888.

Act 123.—Requesting Mississippi River Commission to adopt plan to prevent banks from caving.

Act 124.—Transferring funds to Caddo and Nachitoches sub-districts and to Tensas Basin District.

SESSION OF 1886.

Act 8.—Inviting Arkansas Levee Commissioners to confer with Louisiana Legislative Committees.

Act 44.—Amending Act 33, of 1879, creating Fifth Louisiana Special Levee District.

Amended by Act 16, of 1890.

Amended by Act 4, of 1892.

Amended by Act 48, of 1894.

Act 47.—Appropriations for expenses of State.

Act 48.—Authorizing the Board of State Engineers to survey, stake out and make estimate of the cost of certain levees to protect the alluvial lands of the State.

Act 58.—Duty of Board of State Engineers relative to drainage of Bayou Fontaine.

Act 59.—Repealing Act 26, of 1884, creating Tensas Basin Levee District.

Amended by Act 77, of 1888.

Amended by Act 103, of 1892.

Amended by Act 70, of 1894.

Act 60.—Amending Acts 83, of 1884, and 73, of 1882, relative to distribution of levee funds.

Act 78.—Relative to manner of building levees across sloughs.

Act 79.—Authorizing certain taxes of V. S. & P. R. R. to be placed to credit of Fifth Levee and Tensas Basin Levee Districts.

Act 103.—Creating special levee district in parishes of St. Landry and Avoyelles, provided it be ratified by public election. Lost by election of October 4, 1886.

Act 112.—Amending Acts 88, of 1880, and 104, of 1882. Exempting certain parts of certain parishes from rice flume prescriptions included in above acts.

Act 118.—Authorizing Fifth Louisiana Levee District to build levees in Arkansas.

SESSION OF 1888.

Act 8—To carry into effect Article 214, of the Constitution, as amended by Act 112, of 1884.

Act 39.—Instructing State Board of Engineers to survey New Basin Canal.

Act 45.—Authorizing transfer of certain moneys in General Engineer Fund to credit of 1878 fund.

Act 48.—Appropriations for expenses of State.

Act 67.—Act authorizing certain Police Juries to erect back levees as protection against tidal water.

Act 77.—Amending Act 59, of 1886, and repealing Act 26, of 1884. Relative to Tensas Basin Levee District.

Act 85.—Section 89, levying one mill tax for General Engineer Fund.

Amended by Act 178, of 1894.

Act 108.—Prohibiting riding and driving over public levees.

Act 117.—Relative to expenses of accounts required to keep levee funds.

Act 144.—Appointing a Board of Control for New Basin Canal, and fixing duties of Board of State Engineers with regard to same.

Amended by Act 82, of 1896.

SESSION OF 1890.

Act 1.—Concurrent resolution affirming efficacy of levee system, and condemning outlets.

Act 2.—Concurrent resolution thanking Capt. Dan C. Kingman, United States Engineer, for his efficient levee service.

Act 16.—To amend and re-enact Sections 4 and 5, of Act 44, of 1886, relating to Fifth Louisiana Levee District.

Act 23.—(Joint resolution) Instructing the Board of State Engineers to cause to be removed from the base of all levees, hereafter to be made, all stumps, trees, logs, roots and other matters susceptible to decay.

Act 36.—Prohibiting Register of Conveyances of Orleans from reporting on his certificates any adjudication of real estate to the State for levee taxes of 1880 and 1881, situated in the Fifth District of Orleans.

Act 60.—Making it unlawful for live stock to go on levees during high water.

Amended by Act 46, of 1894.

Act 79.—Creating the Red River, Atchafalaya and Bayou Bœuf Levee District.

Amended by Act 46, of 1892.

Amended by Act 62, of 1894.

Act 80.—Authorizing corporations or boards of public works to borrow money.

Amended by Act 93, of 1894.

Act 82.—Appropriations for expenses of State.

Act 93.—Creating the Orleans Levee District.

Amended by Act 79, of 1892.

Act 95, Creating the Pontchartrain Levee District.

Amended by Act 68, of 1892.

Amended by Act 59, of 1894.

Amended by Act 96, of 1894.

Act 96.—Duties of Board of State Engineers with regard to the drainage of Bayou Pierre.

Act 97.—Creating the Atchafalaya Basin Levee District, and repealing a portion of Act 33, of 1879.

Act 125.—To authorize the Board of Levee Commissioners of the Fifth Louisiana District to issue bonds in place of certain bonds that have been lost or stolen.

Act 144.—To regulate manner in which pipes shall be placed in levee and removal of rice dahls, flumes and other conduits. Prohibiting cutting of public levees.

Annulled by Act 5, of 1892.

SESSION OF 1892.

Act 1.—Transferring $10,000.00 from the Levee and Drainage Fund to the Fifth Louisiana Levee District Fund.

Act 4.—To amend and re-enact Section 9, of Act 44, of 1886, creating the Fifth Louisiana Levee District.

Act 5.—Prohibiting the placing of rice flumes, dahls, pipes or other foreign substances in levees, and requiring Police Juries to cause such existing conduits to be removed before January, 1893.

Annuls Act 144, of 1890.

Amended by Act 62, of 1892.

Act 13.—Creating the Lafourche Basin Levee District, and amending Act 33, of 1879.

Amended by Act 100, of 1892.

Amended by Act 19, of 1894.

Amended by Act 175, of 1894.

Act 14.—Creating the Lake Borgne Basin Levee District, and amending Act 33, of 1879.

Act 16.—Prohibiting the placing of obstructions on levees, such as lumber, building material, fuel, fences, buildings, constructions, etc., and the tying of logs to levees.

Act 35.—Creating of a high water emergency fund of $30,000.00 during high water of 1892.

Act 41.—Authorizing the Board of Commissioners of the Orleans Levee District to levy a special tax for the year 1892, in accordance with existing laws to indemnify the owners of certain property appropriated, damaged or destroyed for levee purposes. See Act No. 25, of 1894.

Act 46.—Amending and re-enacting Act No. 79, of 1890, creating the Red River, Atchafalaya and Bayou Bœuf Levee District.

Act 47.—Appropriation for general expenses of the State.

Act 53.—Appropriating $1,500.00 for the relief of Thomas O'Malley, for the loss of tools, etc., on levee work in the parish of Pointe Coupee.

Act 62.—To amend Act No. 5, of acts of 1892, prohibiting rice flumes, dahls, pipes and other foreign substances in the public levees, and to regulate the use of syphons for irrigating and other purposes.

Act 68.—To amend and re-enact Section 7, of Act No. 95, of 1890, relative to creating the Pontchartrain Levee District.

Act 74 —Creating the Caddo Levee District.

Amended by Act 90, of 1894.

Act 79.—To amend and re-enact Section 6, of Act No. 93, approved July 7, 1890, entitled an Act to establish the Orleans Levee District, etc.

Act. 83.—Authorizing Auditor to warrant on various district funds to pay for increased expense of keeping accounts for said funds.

Act 89.—To create the Bossier Levee District.

Amended by Act 104, of 1894.

Act 91.—Requesting the Governor to instruct the Board of State Engineers to make a survey of the I. C. R. R. embankment, to determine whether it interferes with natural drainage of crevasse water.

Act 98.—Designating the distance from levee for irrigating lands, prohibiting cutting of levees, regulating the use of syphons, etc.

Act 100.—To amend and re-enact Section 1, of Act No. 13, of 1892, creating the Lafourche Basin Levee District.

Amended by Act 175, of 1894.

Act 102.—Amending and re-enacting Act 83, of 1884, and providing for the distribution of the General Engineer Fund.

Act 103.—Amending Act 59, of 1886, creating the Board of Commissioners for the Tensas Basin Levee District.

Act 110.—To encourage, protect and regulate the oyster industry, etc. The Board of State Engineers to furnish map of shore lines, etc. of each of said parishes, to Police Juries of said parishes.

Amended by Act 121, of 1896.

SESSION OF 1894.

Act 10.—Fixing the time within which sworn statements to obtain postponement of payment and collection of taxes on account of overflow and other causes, shall be made and filed.

Act 18.—Creating the Buras Levee District.

Act 19.—To amend and re-enact Section 9, of Act No. 13, of 1882 (Lafourche Basin Levee District).

Act 25.—Authorizing Orleans Levee Board to pay over to such persons whose property has been expropriated in accordance with Act 41, of 1892.

Act 26.—Authorizing Police Juries to work parish prisoners on roads, levees, public works, etc., under certain conditions.

Act 36.—Requiring all State and District Boards, State and District officers, to file with Auditor of Public Accounts, itemized, detailed semi-annual reports.

Act 46.—Making it a misdemeanor for any person, whether the owner or not, of any horse, mule, cattle, etc., impounded under the provision of Act No. 60, of 1890, to go on levees, etc., and amending Act 60, of 1890.

Act 48.—To amend and re-enact Section 10, Act 44, of 1886 (Fifth Louisiana Levee District), levying special assessment, collection, etc., and ordering Board of State Engineers to make a survey of Bougere Crevasse.

Act 51.—Making it unlawful for the city of New Orleans and others to drain into New Basin Canal.

Act 59.—Authorizing the Board of Commissioners for the Pontchartrain Levee District to issue and negotiate $1,000,000 bonds. Amending Act 95, of 1890.

Act 62.—Authorizing the Board of Commissioners of Red River, Atchafalaya and Bayou Bœuf, to build a culvert at the mouth of Mill Bayou. Referring to Act 79, of 1890.

Act 65.—To secure the more effective collection of the special assessment and forced contributions of levee boards, etc.

Act 70.—To amend and re-enact Section 10, of Act No. 59, of 1886, creating the Tensas Basin Levee District.

Act 82.—Appropriations for general expenses of State

Act 90.—To amend Act 74, of 1892 (Caddo Levee District), and more fully designate what lands shall be subject to taxation for levee purposes, etc.

Act 93.—Amending Act 80, of 1890, relative to corporations engaged in construction of public works, levees, etc.

Act 96.—To amend Act 95, of 1890 (creating Pontchartrain Levee District), with regard to its ownership of public lands.

Act 104.—To amend Act 89, of 1892 (Bossier Levee District), and more fully designate what lands shall be subject to taxation for levee purposes.

Act 110.—Creating Cat Island Levee District.

Act 131.—Authorizing the parish of Concordia, through its Police Jury, to issue bonds for levee purposes, etc.

Act 175.—To amend and re-enact Section 1, Act 100, of 1882; Section 1, Act 13, of 1892, Lafourche Basin Levee District.

Act 178.—Amending Act 85, of 1888, and providing for the levying of the one mill tax for General Engineer Fund.

SESSION OF 1896.

Act 20.—Recommending to the consideration of the Atchafalaya Basin Levee District the use of Sewall dykes in the Bayou Goula Bend.

Act 26.—Making appropriations for the general expenses of State.

Act 39.—Making appropriations out of General Engineer Fund to pay counsel fees in the case of William B. Eldridge vs. The Board of State Engineers, and Peter J. Trezevant, contractor.

Act 48.—Authorizing Board of State Engineers to examine the Baptist Collet Canal, and to close same under certain contingencies.

Act 52.—Section 1 calling for a Constitutional Convention and imposing certain limitation, among which one on the subject of levee laws.

Act 82.—Amending Section 12, of Act 144, of 1888, with regard to New Basin Canal and Shell Road.

Act 121.—Repealing and re-enacting Act 110, of 1892, to protect the oyster industry.

Act 126.—Exempting Levee Board lands from provisions of this act with regard to public tax sales.

APPENDIX F.—PLATES.

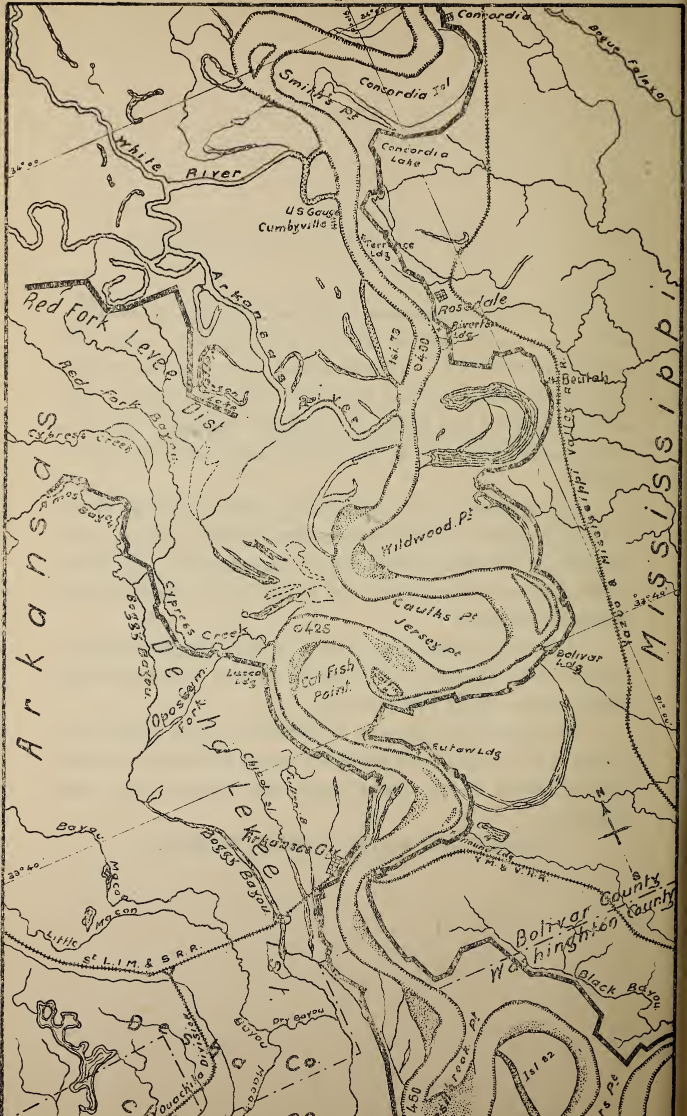
The following plates numbered from 1 to 12 inclusive, are intended to show, in a general way, the extent and location of the levee lines on the Mississippi River, protecting the State of Louisiana, with such parts of the lines on interior streams as it is possible to include in the limited area covered by the plates.

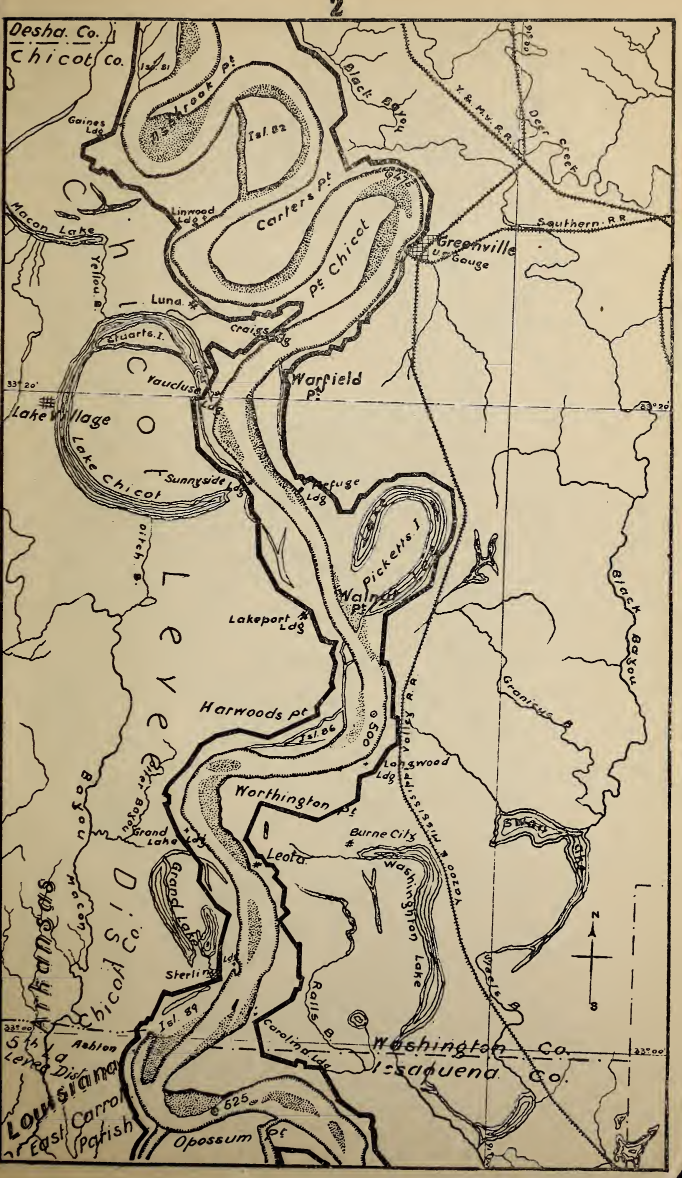
These plates are reproduced from tracings of the "District Map of the Lower Mississippi River, published by the Mississippi River Commission," in 1897, with certain corrections and additions by the Board of State Engineers.

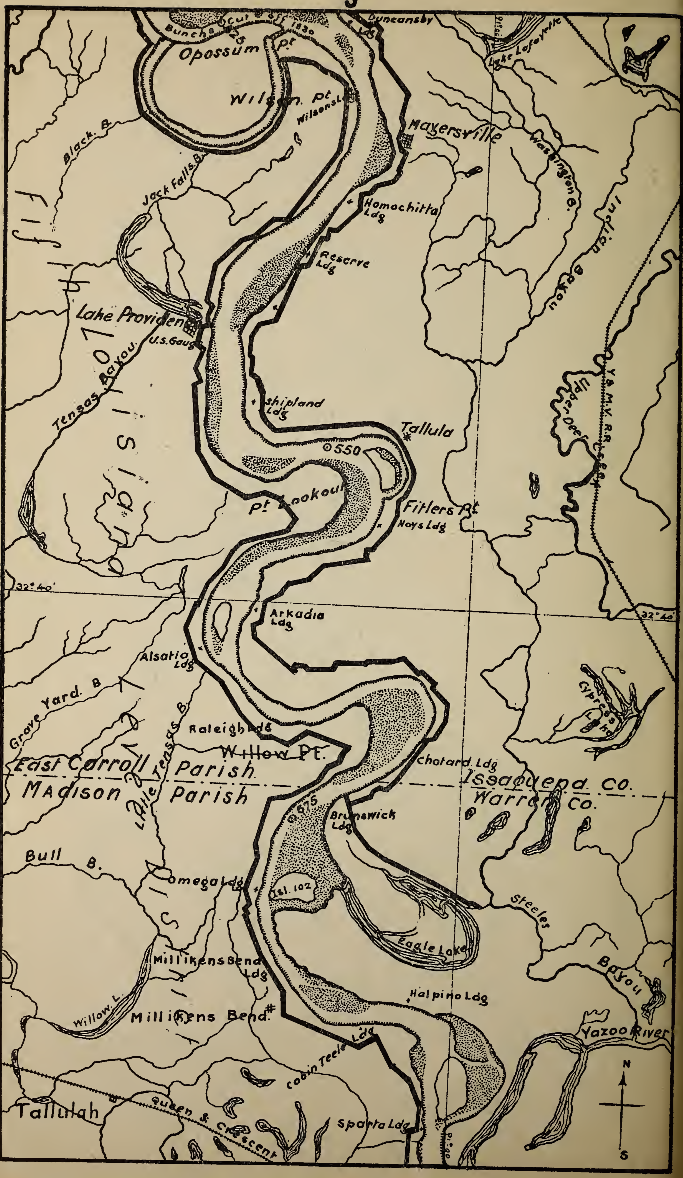
The levee lines are shown by the irregular heavy black line following the general course of the streams along which they are located.

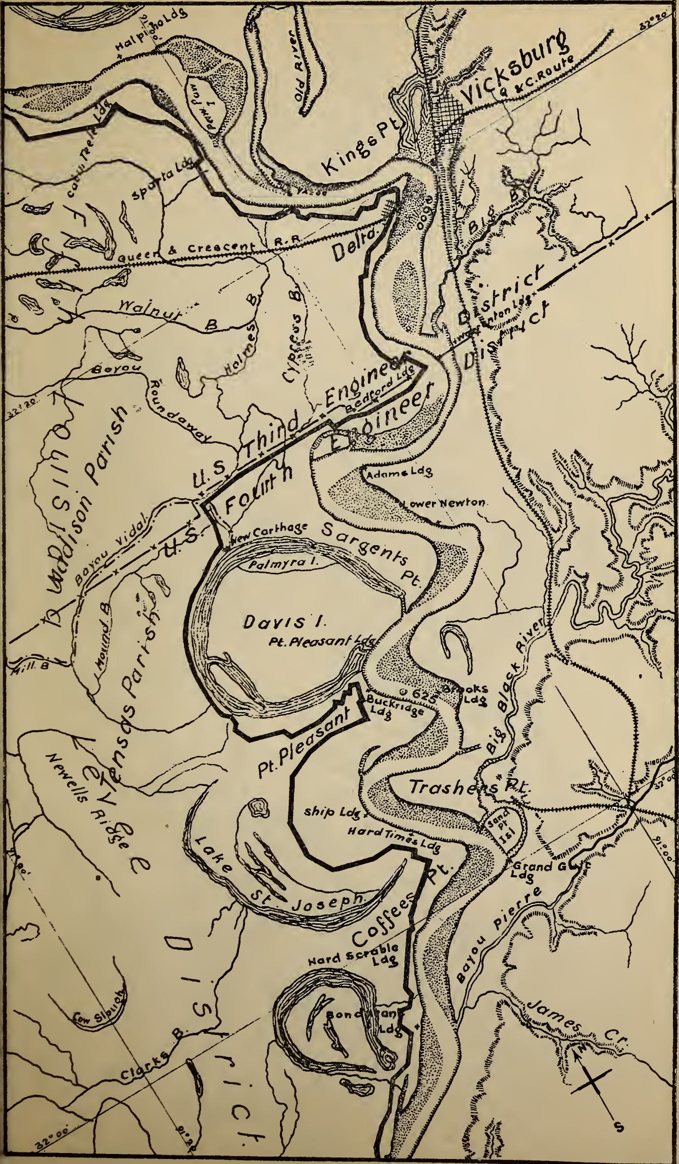
The figures in the bed of the river, from "400" on plate 1, to "1050" on plate 12, mark distance in miles below Cairo of the small dots and circles near the figures.

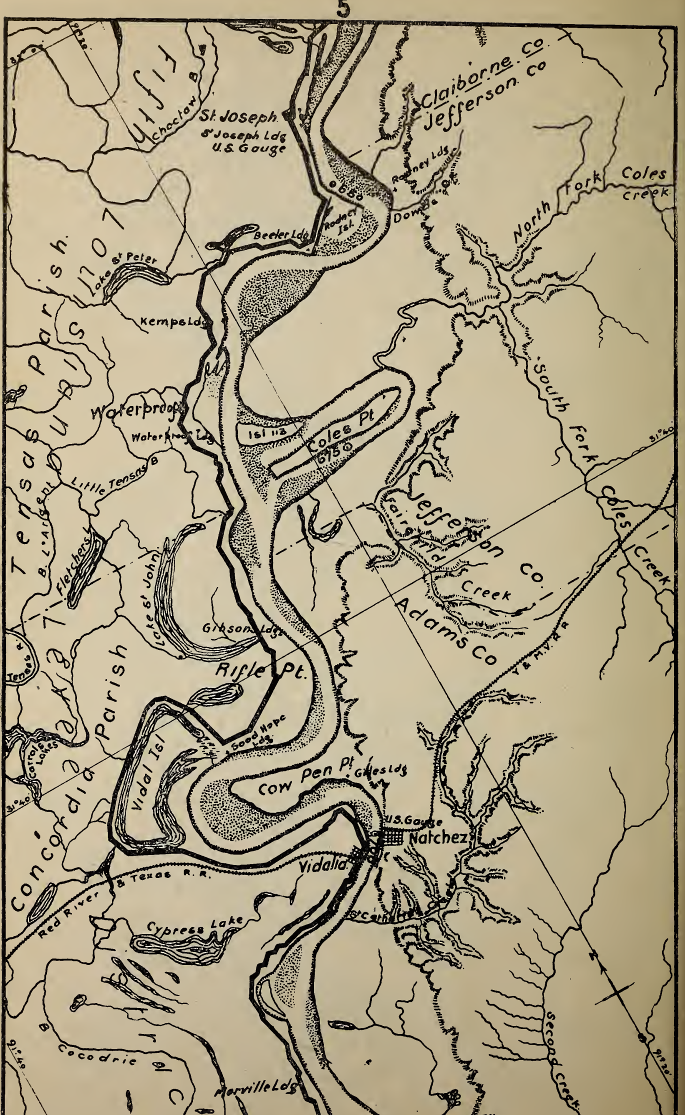
SCALE OF MAPS, 1 INCH=5 MILES.

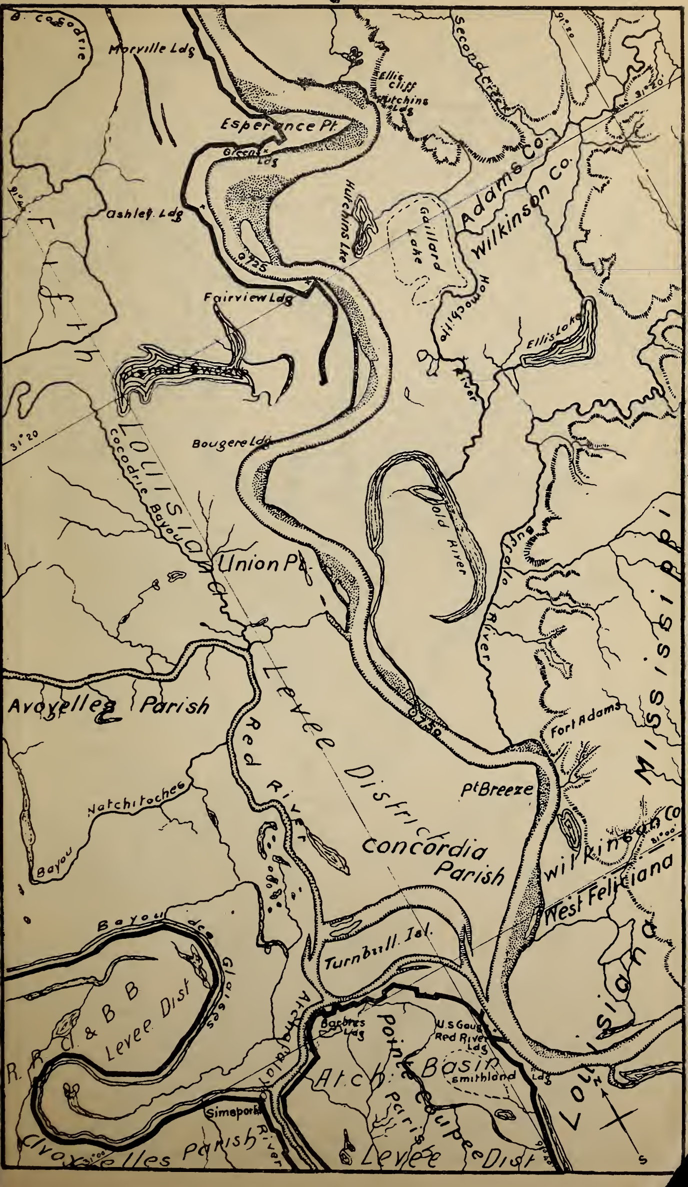

Concordia
Bogue Falaya
34° 00
Smith's Pt
Concordia Isl
White River
Concordia Lake
US Gauge Cumbyville
Ferrence Ldg
Arkansas River
Red Fork Levee Dist
Red Fork Bayou
Rosedale
Riverton Ldg
Isl 73
0 400
Beulah
Cypress Creek
Mississippi
Yazoo & Mississippi Valley R.R.
Arkansas
Amos Bayou
Wildwood Pt
Caulks Pt
Jersey Pt
33° 40
Cypress Creek
0 425
Boggs Bayou
Bolivar Ldg
Lucca Ldg
Cat Fish Point
Opossum Fork
Desha Levee
Chicot sl
Eutaw Ldg
N
Bayou Macon
33° 40
Boggs Bayou
Arkansas City
L.N.O. & T. R.R.
Bolivar County
Washington County
Little Macon
St L.I.M. & S R.R.
Black Bayou
Dry Bayou
Ouachita Division
Bayou Macon
Co.
Co.
Desha
Chicot
Isl 82
0 450
Carters Pt

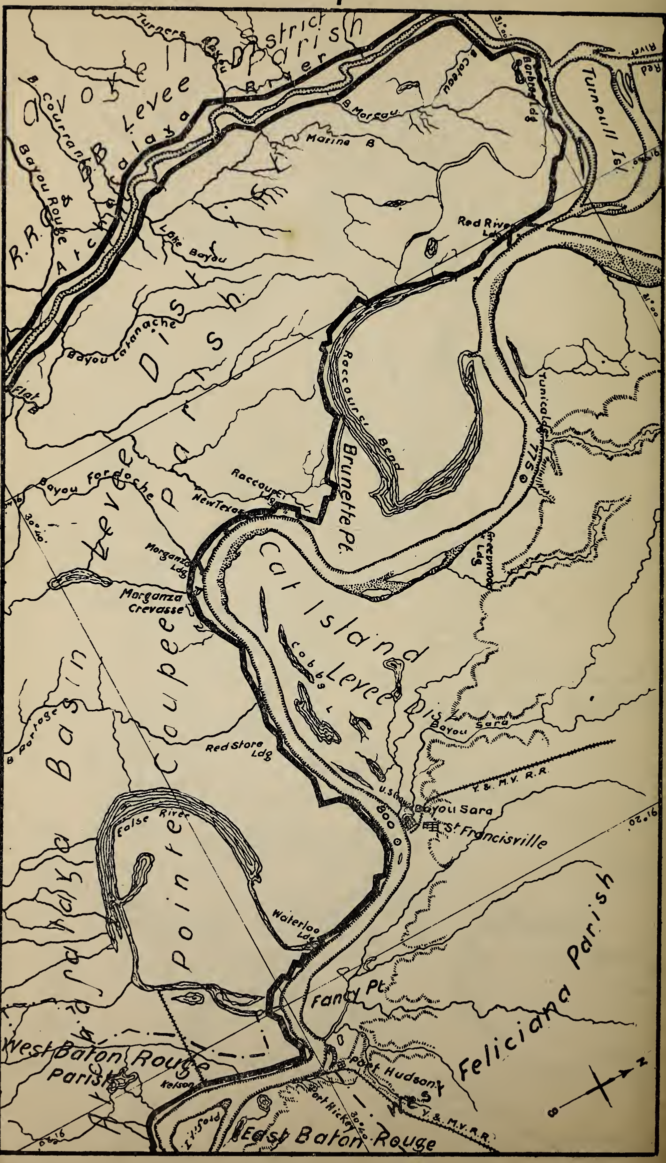

Desha Co.
Chicot Co.
Isl. 81
Ashbrook Pt
Gaines Ldg
Isl. 82
Black Bayou
Y. & M.V. R.R.
Deer Creek
Carters Pt
475
Linwood Ldg
Macon Lake
Yellow B.
Pt Chicot
Southern R.R.
Greenville
U.S. Gauge
Luna
Craigs Ldg
Stuarts I.
Vaucluse Ldg
Warfield Pt
33° 20'
Lake Village
Lake Chicot
Sunnyside Ldg
Refuge Ldg
Lake
Picketts I
Ditch B.
Walnut Pt
Lakeport Ldg
Chicot Levee Dist.
Black Bayou
Harwoods Pt
Isl. 86
500
Granicus B.
Yazoo & Mississippi Valley R.R.
Longwood Ldg
Worthington Pt
Bayou Macon
Otter Bayou
Grand Lake Ldg
Burne City
Leota
Swan Lake
Washington Lake
Grand Lake
Chicot Co.
Arkansas
N
S
Sterling Ldg
Ralls B.
Wade B.
Isl. 89
33° 00'
Ashton
Carolina Ldg
Washington Co.
Issaquena Co.
5th La Levee Dist.
Louisiana
East Carroll Parish
625
Opossum Pt

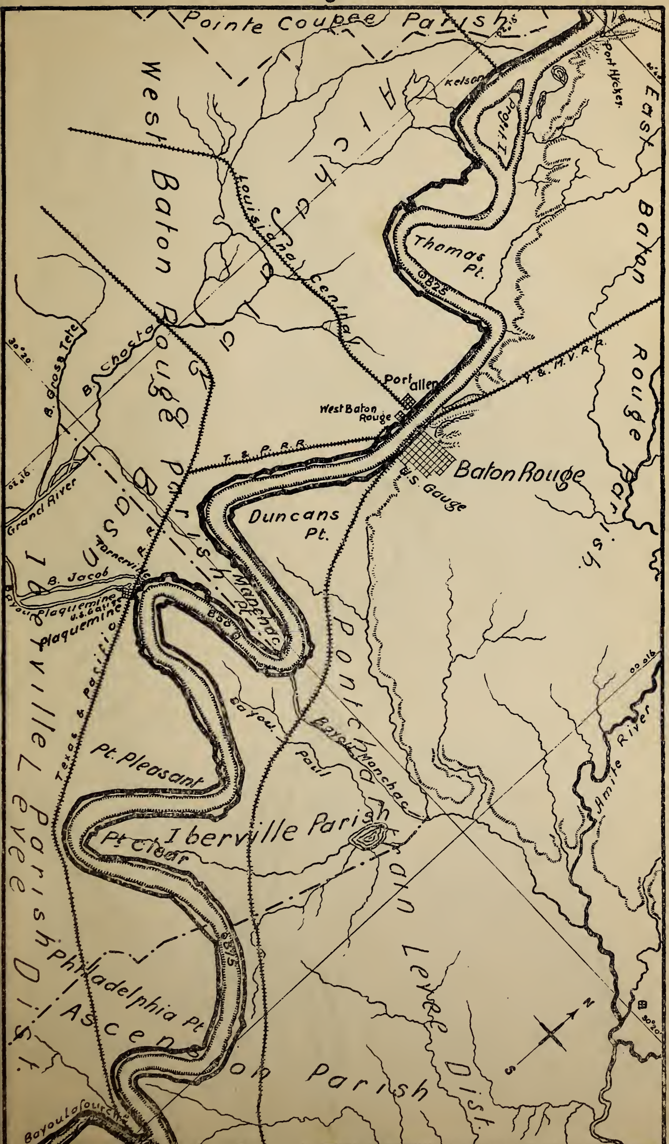

Bunch's Cut off 1830
25
Duncansby Ldg
Opossum Pt
Wilson. Pt
Wilsons Ldg
Lake Lafayette
Mayersville
Black. B.
Jack Falls. B.
Washington B.
Indian Bayou
Homochitta Ldg
Reserve Ldg
Fifth District
Lake Providence
U.S. Gauge
Tensas Bayou.
Shipland Ldg
Tallula
Y. & M.V. R.R.
Upper Deer Creek
550
Pt Lookout
Fitlers Pt
Hays Ldg
32° 40'
Arkadia Ldg
Alsatia Ldg
Grave Yard. B
Cypress Lake
Raleigh Ldg
Willow Pt.
Chotard Ldg
East Carroll Parish
Madison Parish
Issaquena Co.
Warren Co.
Tensas B.
675
Brunswick Ldg
Bull B.
Omega Ldg
Isl. 102
Steeles Bayou
Eagle Lake
Millikens Bend Ldg
Halpino Ldg
Willow L.
Millikens Bend
Yazoo River
Cabin Teele Ldg
N
S
Tallulah
Queen & Crescent
Sparta Ldg

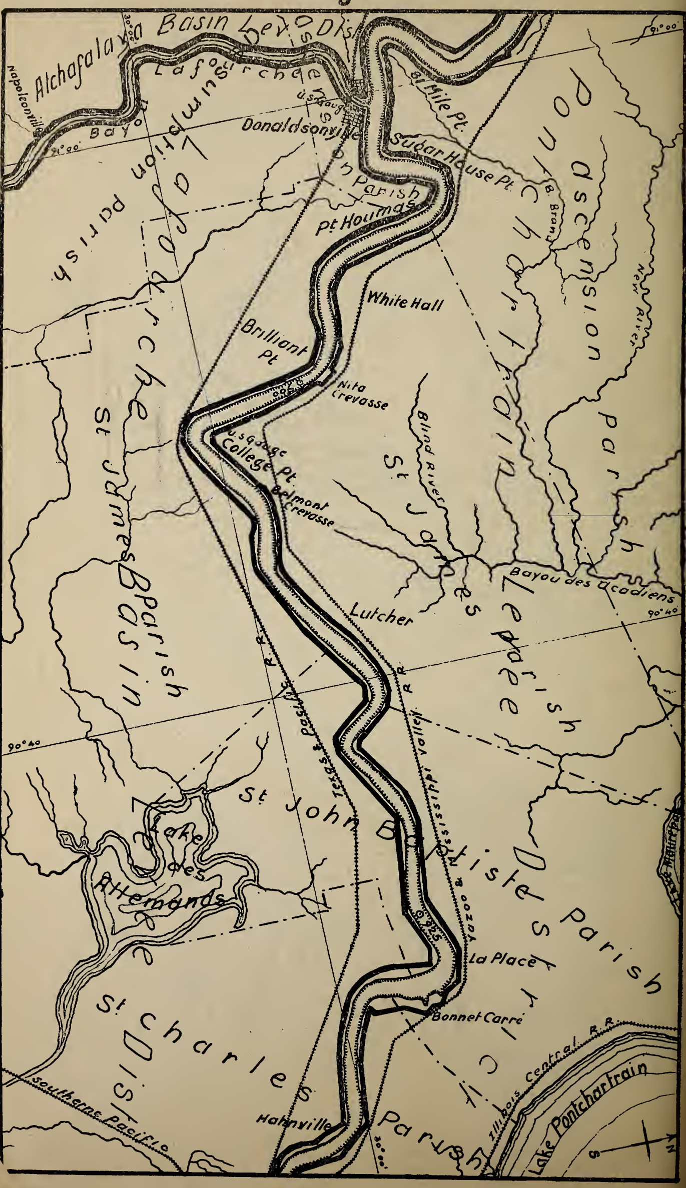

Halpino Ldg
Paw Paw I.
Old River
Kings Pt.
Vicksburg
Q & C. Route
32°20'
Cabin Teele Ldg
Sparta Ldg
Yazoo
Queen & Crescent R.R.
Delta.
600
Big B.
District
Warrenton Ldg
District
Walnut B.
Holmes B.
Cypress B.
Bayou
Roundaway
32°20'
Bedford Ldg
U.S. Third Engineer
Engineer
Madison Parish
Louisiana
U.S. Fourth
U.S.
Adams Ldg
Lower Newton
New Carthage
Sargents Pt.
Palmyra I.
Bayou Vidal
Davis I.
Pt. Pleasant Ldg
Mound B.
Tensas Parish
Hill B.
625
Brooks Ldg
Buckridge Ldg
Big Black River
Pt. Pleasant
Levee
Newells Ridge
Trashers Pt.
32°00'
Ship Ldg
Sand Pt. Isl
Hard Times Ldg
Grand Gulf Ldg
91°00'
Lake St. Joseph
Coffees Pt.
Bayou Pierre
Hard Scrabble Ldg
District
Cow Slough
Bondurant Ldg
James Cr.
Clarks B.
N
S
32°00'
91°20'

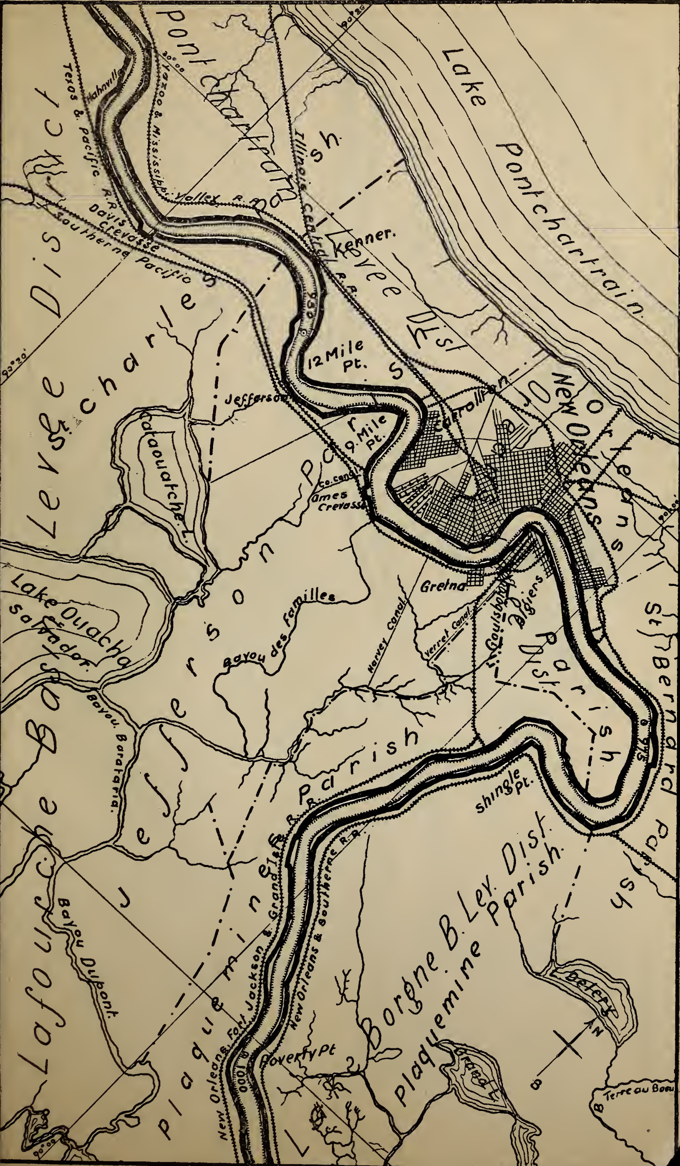

St. Joseph
St Joseph Ldg
U.S. Gauge
Choctaw B
Claiborne Co
Jefferson Co
Rodney Lds
Rodney Isl.
6550
North Fork
Coles Creek
Beeler Ldg
Lake St Peter
Kemps Ldg
Tensas Parish
Waterproof
Waterproof Ldg
Little Tensas B
B. L'Argent
Isl 113
Coles Pt
6750
South Fork
Coles Creek
Jefferson Co.
Fairchild Creek
Adams Co
Y & M.V. R R
Fletchers L
Lake St John
Gibson Ldg
Rifle Pt.
Tensas R.
Carroll Lakes
Concordia Parish
Vidal Isl
Good Hope Ldg
Cow Pen Pt
Giles Ldg
U.S. Gauge
Natchez
Vidalia
Red River & Texas R.R.
Cypress Lake
B Cocodrie
Morville Ldg
Second Creek
Ellis Cliff
Hutchins Ldg
Esperance Pt
31°40'
91°20'
91°40'

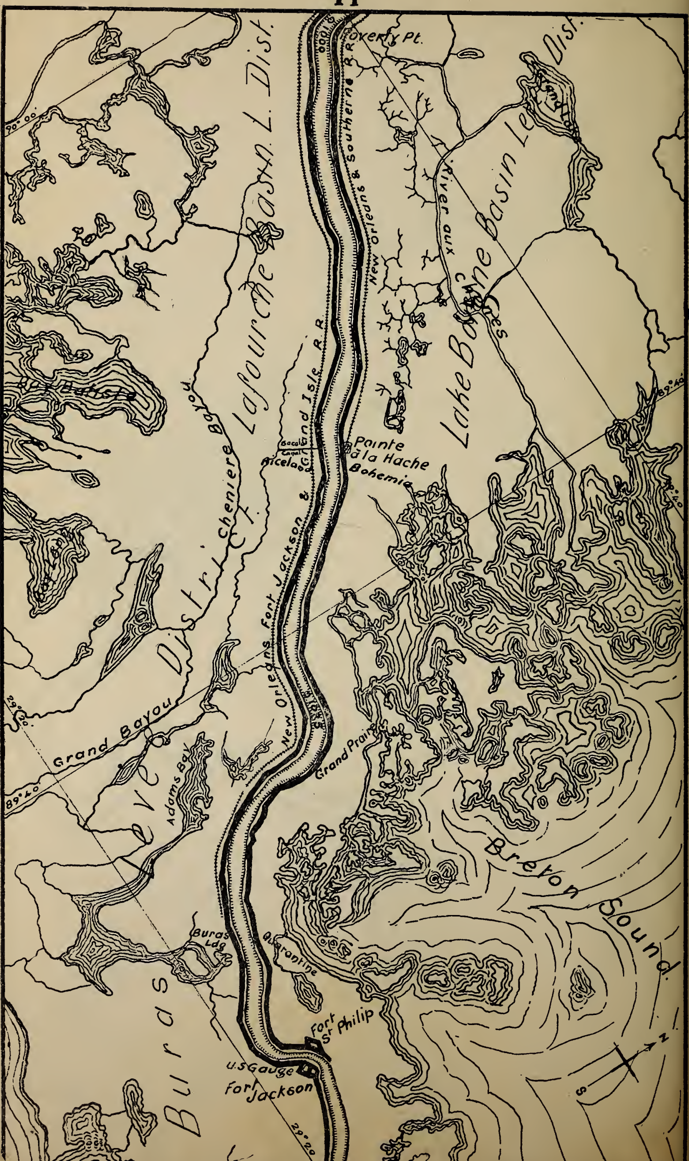

B. Cocodrie
Morville Ldg
Ellis cliff
Hutchins Ldg
Second Creek
Esperance Pt.
Greens Ldg
Ashley Ldg
Hutchins Lke
Gaillard Lake
Adams Co.
Wilkinson Co.
0725
Fairview Ldg
Homochitto River
Ellis Lake
Fifth
31°20
Louisiana
Cocodrie Bayou
Bougere Ldg
Old River
Buffalo River
Union Pt.
Levee District
Mississippi
Avoyelles Parish
Red River
0730
Fort Adams
Pt Breeze
Natchitoches Bayou
Concordia Parish
Wilkinson Co
31°00
West Feliciana
Turnbull Isl.
Bayou des Glaises
R. R. Cl. & B B Levee Dist
Atchafalaya
Barbres Ldg
U.S. Gauge Red River Ldg
Point Coupee Basin
Smithland
Ldg
Atch. Parish
Simeport
River
Avoyelles Parish
Point Coupee Levee Dist
Louisiana
N
S

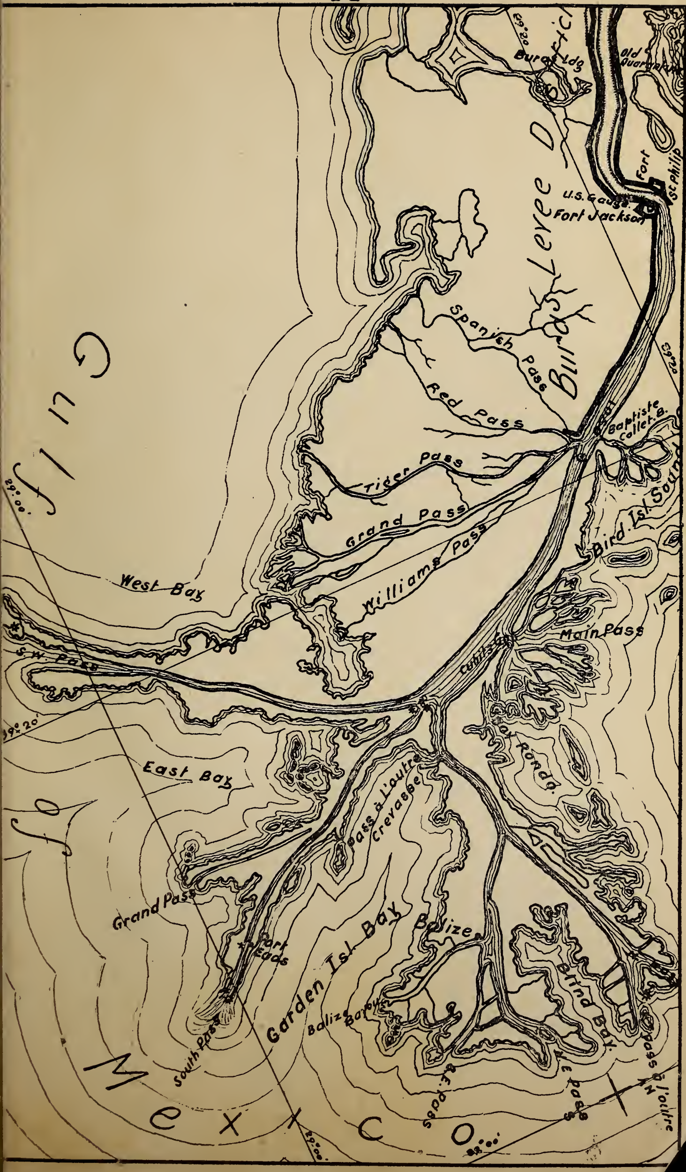

Avoyelles Parish
Red River Levee District
Turners
Atchafalaya
B. Courrant
Bayou Rouge
R.R.
Atchafalaya Basin Levee District
Lake Bayou
Marina B
B. Moreau
B. Coteau
Barbre Ldg
Red River
Turnbull Is.
Red River Ldg
Bayou Latanache
Flat
Pointe Coupee Parish
Raccourci Bend
Brunette Pt.
Tunica Ldg
775
Raccourci Ldg
New Texas
Bayou Fordoche
Morganza Ldg
Morganza Crevasse
Greenwood Ldg
Cat Island Levee Dist.
Cobbs I.
B. Portage
Red Store Ldg
Bayou Sara
Y. & M.V. R.R.
U.S.
800
St. Francisville
False River
Waterloo Ldg
Fancy Pt.
West Feliciana Parish
West Baton Rouge Parish
Kelson
Port Hudson
Port Hickey
Profit I.
East Baton Rouge
N
S
91°00'
31°00'
91°20'
30°40'


Pointe Coupee Parish
West Baton Rouge Parish
Atchafalaya Basin
Kelson
Profit I.
Port Hickey
East Baton Rouge Parish
Louisiana Central
Thomas Pt.
6825
B. Grosse Tete
B. Choctaw
30°20'
91°20'
Port allen
West Baton Rouge
Y. & M.V. R.R.
T. & P. R.R.
Baton Rouge
U.S. Gauge
Grand River
Duncans Pt.
Turnerville R.R.
B. Jacob
Bayou Plaquemine
U.S. Gauge
Plaquemine
858
Manchac Pt.
Pontchartrain Levee Dist.
Texas & Pacific
Bayou Paul
Bayou Manchac
Amite River
91°00'
Pt. Pleasant
Iberville Parish
Pt. Clear
Iberville Levee Dist.
6875
Philadelphia Pt.
Ascension Parish
N
S
30°20'
Bayou Lafourche


Atchafalaya Basin Lev. Dist.
Napoleonville
30°00'
Bayou Lafourche
91°00'
U.S. Gauge
Donaldsonville
Ascension Parish
Assumption parish
Lafourche Basin
81 Mile Pt.
Sugar House Pt.
B. Brand
Pontchartrain Levee District
Ascension Parish
New River
Pt. Houmas
White Hall
Brilliant Pt.
Nita Crevasse
Blind River
U.S. Gauge
College Pt.
Belmont Crevasse
St. James Parish
St. James Parish
Bayou des Acadiens
90°40'
Lutcher
Texas & Pacific R.R.
Yazoo & Mississippi Valley R.R.
90°40'
St. John Baptiste Parish
Lake des Allemands
Lake Maurepas
La Place
Bonnet Carré
Illinois Central R.R.
Lake Pontchartrain
St. Charles Parish
Lafourche Basin Dist.
Southern Pacific
Hahnville
30°00'
N
S


Lake Pontchartrain.
Pontchartrain
St. Charles
Levee Dist
Jefferson Parish
Orleans Levee Dist
New Orleans
St. Bernard Parish
Lafourche Basin
Borgne B. Ley. Dist.
Plaquemine Parish
Hahnville
Texas & Pacific R.R.
Yazoo & Mississippi Valley R.R.
Illinois Central R.R.
Davis Crevasse
Southern Pacific
Kenner.
12 Mile Pt.
Jefferson
9 Mile Pt.
Co. Canal
Ames Crevasse
Carrollton
Gretna
Algiers
Goulsboro
Verret Canal
Harvey Canal
Cataouatche L.
Lake Ouacha
Salvador
Bayou des Familles
Bayou Barataria
Bayou Dupont.
Shingle Pt.
Poverty Pt
New Orleans, Fort Jackson & Grand Isle R.R.
New Orleans & Southern R.R.
Grand L.
Terre au Boeuf
N
30°00
90°20'
90°00
950
1000


Poverty Pt.
Lake Borgne Basin L. Dist.
River aux Chenes
New Orleans & Southerne R.R.
Lafourche Basin L. Dist.
New Orleans Fort Jackson & Grand Isle R.R.
Bay Batiste
Cheniere Bayou
Bocold
Canal
Riceland
Pointe à la Hache
Bohemia
Buras Levee District
Grand Bayou
Adams Bay
Grand Prairie
Breton Sound
Buras Ldg
Quarantine
Fort St Philip
U.S Gauge
Fort Jackson
90°00'
89°40'
29°30'
89°40'
29°40'
29°20'
N
S


Buras Ldg
Old Quarantine
Buras Levee District
Fort St Philip
U.S. Gauge.
Fort Jackson
89°20'
Spanish Pass
Red Pass
Baptiste Collet B.
Tiger Pass
Grand Pass
Bird Isl. Sound
Williams Pass
West Bay
Main Pass
S.W. Pass
Cubits Gap
29°20'
Bay Ronda
East Bay
Pass à L'outre Crevasse
Grand Pass
Port Eads
Garden Isl. Bay
Balize
Blind Bay
Balize Bayou
South Pass
S.E. pass
E pass
N. pass à l'outre
Gulf of Mexico
29°00'
89°00'

INDEX.

A

Acts creating levee districts ....3, 172. See also App. E.
Amount and cost of levee work ....5, 66 to 73, 170
Arkansas, Levee work in, protecting Louisiana........................ 5
Atchafalaya Basin Levee District 9, 32, 44
    Reports to Commissioners of..77 to 98
    Report on work done by, 1898, January to April......................93
    Report on high water of 1897 in..82
Average prices of levee work ....66 to 69

B

Babin Levee, Report on situation at, February 10, 1898......................92
Baptist Collet Canal 29, 146
Baton Rouge, Report on proposed new levee at..............................105
Bayou des Glaizes, Crevasses on...138
Bayou Lafourche, Closure by dike or locks.. ....12, 28
    Crevasses on..12, 17, 25, 84, 150
    Grade of levee on...... 28
    High water in 10, 16, 23, 84
Big Bend, Drainage of..137
Board of State Engineers, Duties of....................... 3, See also App. E.
Bonds of levee districts...6, 172
Bossier Levee District...20, 36, 127 to 135
    Conditions of levees in, September, 1897 132
    Reports to Commissioners of......................................127 to 135
Bougere Landing, unleveed front below.................8, 9, 26, 150, 155, 164
Buras Levee District...19, 34, 52, 122

C

"Cairo datum"..See note at end of App D.
Caddo Levee District...19, 34, 122 to 127
    Reports to Commissioners of ....122 to 127
Canal, Baptist Collet 29, 146
Canal, New Basin and Shell Road...29
Care and preservation of levees........................... 125
Cost and amount of levee work.......................................5, 66 to 73, 170
    Since 1865. 170

Cost of revetment in several districts 6, 16, 18, 19
Cat Island Levee District..13
Crevasses of 1897 ....23 to 26
    On Amos Bayou, Arkansas...23, 150
    On Bayou des Glaizes...21, 25, 138, 150
    On Bayou Lafourche...12, 17, 25, 84, 150
    On Mississippi River, in Louisiana 9, 15, 24, 25, 26, 150
Crevasse on Bayou Lafourche, April 19, 1898...26
Co-operation with United States in levee work, Importance of.........108

D

Damage done to levee by hogs.......................................124, 131, 134
Delay of levee work by quarantine, etc..4
Districts, The levee.......................6 to 22. See "Levee Districts, The"
    Acts creating..3, 172. See also App. E.
    Proposed new district...6
Drainage of levees, Importance of...86, 127
Duties of Board of State Engineers.........................3. See also App. E.

E

Elevation of high water above Gulf level...........................See App. D.

F

Flood of 1897..22, 151
Fifth Louisiana Levee District...8, 32, 42
Fort St. Philip, Proposed new levee district below..............................6

G

Grades of levees...17, 26 to 29, 87, 152, 156

H

High water and crevasses..22 to 26
High water of 1897..22, 151
    Compared with previous years.........8, 10, 14, 16, 18, 22, 83, 84, 85
High water expenses.................................6, 7, 9, 13, 15, 16, 17, 18, 19, 21
High water records, 1872 to 1897 ....Appendix D.
Hogs, Damage done to levees by..124, 131, 134

L

Lafourche Basin Levee District..15, 34, 48
    Reports to Commissioners of...108 to 117

Lafourche Bayou, Closure by dike or locks 12, 28
  Crevasse on...12, 17, 25, 84, 150
  Grade of levee on...28
  High water in..10, 16, 23, 84

Lake Borgne Basin Levee District 18, 34, 50
  Reports to Commissioners of...120, 121

Laws creating levee districts ....3, 172. See also App. E.

Levees, Care and preservation of...125
  Cost and amount of work on.......................................5, 66 to 73, 170
  Cost and amount since 1865..170
  Drainage of important..86, 127
  Efficiency of..149
  Extension of on Red River...161
  Grades of...17, 26 to 29, 87, 152, 156
  Length and contents of..148, 168
  Resources of State and districts for...................................160, 172
  Work required for improvement...158

Levee Districts, the...6 to 22
  Acts creating districts..............................3, 172. See also App. E.
  Atchafalaya Basin District.................................9, 32, 44, 77 to 98
  Bossier District..20, 36, 127 to 135
  Buras District...19, 34, 52, 122
  Caddo District..19, 34, 122 to 127
  Cat Island District...13
  Fifth Louisiana District...8, 32, 42
  Lafourche Basin District..............................15, 34, 48, 108 to 117
  Lake Borgne Basin District...................................18, 34, 50, 120, 121
  Orleans District 17
  Pontchartrain District..................................13, 32, 46, 98 to 108
  Red River, Atchafalaya and Bayou Bœuf
    District...20, 36, 54, 136 to 144
  Tensas Basin District..7, 40

Levee work of the past two years..4
  Prices of..See App. A., 32 to 73
  By the United States...4, 5, 56 to 64

N

New Basin Canal and Shell Road 29
New levee district proposed...6

O

Orleans Levee District...17
  Report on condition of levees, May, 1898.......................................117

P

Pontchartrain Levee District..13, 32, 46
    Reports to commissioners of...98 to 108
Prices of levee work...See App. A , 32 to 73
    Average prices...66 to 69

Q

Quarantine regulations delayed levee work...4

R

Red River, Atchafalaya and Bayou Bœuf Levee District.........20, 36, 54
    Reports to commissioners of...136 to 144
Resources of State and districts for levee purposes.......................160, 172

S

Scopini Levee damaged by hogs..131
"Sewall Dikes," report on..77
State levee contracts, tabular statement of details.......App. A., 32 to 39
St. Martin, private levee, report on..81

T

Tensas Basin Levee District...7, 40
Texas & Pacific Railway, lands upon which built subject to overflow..136

U

United States levee work..4, 5, 56 to 64
    Delayed in 1896...4
    Detailed statements of...56 to 64
    Importance of co-operation in...108

THE LIBRARY OF THE
JUL 25 1933
UNIVERSITY OF ILLINOIS